

FEBRUARY 1956

chemical processing

For Men who Manage

lift trucks save \$10,560/yr in labor	16
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radioisotopes aid process development	135
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EXECUTIVE MAGAZINES FOR INDUSTRY

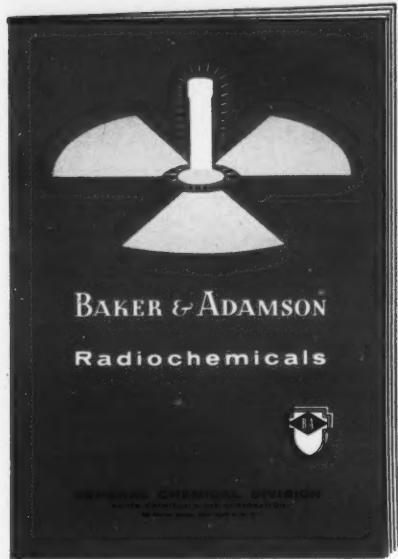


"SQUEEZING" LITHIUM FROM LOW-GRADE ORE

Illustration illustrates part
of Lithium Corporation of America's
process at Greensboro, N.C.—see page 135



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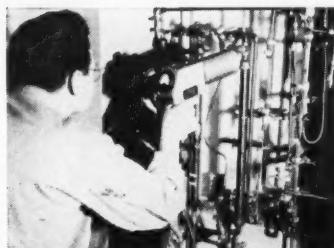
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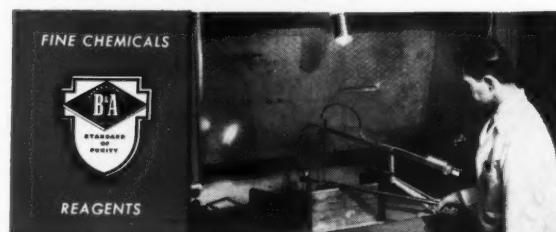
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Illustration from catalog showing use of radioactive piston ring to study engine wear (Standard Oil (N.J.) Photo)



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THAT'S
INTERESTING



Like Topsy it just grew

Uranium rods used as cores in atomic reactors have, under some conditions, doubled their length after a burnup of only one atom in each thousand. Experience has shown that fuel elements made of uranium lose their shape badly under nuclear bombardment and even under repeated temperature cycles.

Dimensional changes in uranium are found to be closely related to methods of fabrication, temperatures used in fabricating, and chemical composition of the metal. In fact, if a high enough temperature is used in fabrication, the growth is reversed and the metal is observed to shorten under irradiation.

Air conditioning for the whole town

Pneumatic bricks that may make possible the weather-conditioning of entire communities by an air-tight dome have been announced by the Air Force and the University of Illinois. Bricks are triangular plastic pillows about three feet long and four inches wide, held firm by air pressure of only two pounds inside of them. If made from new plastics, such as polycoated Mylar, their walls need be only half the thickness of human hair. (Armour Research Foundation *Industrial Research Newsletter*)

Thar she blows — with the accent on resins

US Navy is building some 100 whale boats (auxiliary equipment on most Navy ships) from fibrous glass-reinforced polyester resin supplied by Reichhold Chemicals, Inc.

New craft, 26 feet in length, will be 500 pounds lighter than comparable steel vessels. Lustrous natural finish will require no paint for durability; no calking because hulls are leak and rot-proof; and little maintenance.

Resin has high impact strength and can be patched easily should any damage occur.

(Please turn to page 231)

chemical processing

(CHEMICAL PROCESSING PREVIEW)

for men who manage

Vol. 19

February, 1956

No. 2

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Photo courtesy Cotan Division, Interchemical Corporation, Newark, N. J.

Now—it's "Wall-Plastic"

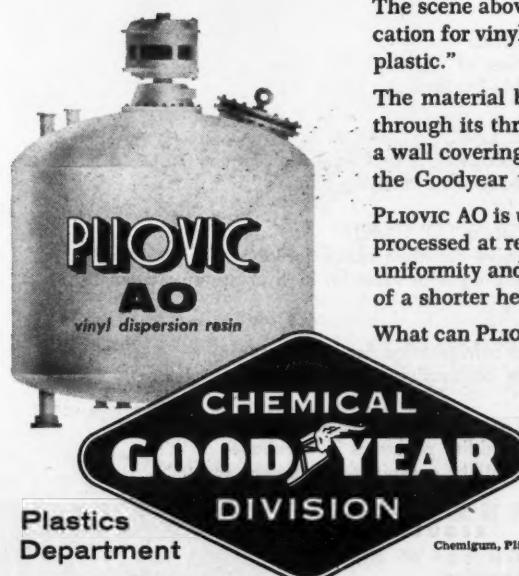
The scene above illustrates a new, momentum-gathering field of application for vinyl resins—the fast-growing trend from wallpaper to "wall-plastic."

The material being shown is *Cohyde* — a plastic coated fabric which through its three-dimensional beauty and durability is outstanding as a wall covering. And it is made with a plastisol based on *PLIOVIC AO* — the Goodyear vinyl resin especially designed for use in dispersions.

PLIOVIC AO is used in this premium-quality covering because it can be processed at relatively low temperatures. This in turn, affords greater uniformity and better physical properties in the end product, by virtue of a shorter heat history.

What can *PLIOVIC AO* do for you in the manufacture of wall coverings or any of the many other coated fabric products? Why not find out by writing to: Goodyear, Chemical Division, Dept. N-9435, Akron 16, Ohio.

Cohyde—T. M. Interchemical Corporation, New York, N. Y.



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Over
the editor's
shoulder

"Bleeding in the Gutter"

The term conjures up images of gang warfare and mob rule, but it's merely part of the jargon of the layout and production of a magazine. Gutters are the center of the magazine — where facing pages come together. Bleeding is a matter of placing type, or, more often, pictorial matter in the gutter . . . the center of two facing pages. Pictures are also "bled" to the top, bottom and sides of a page . . . all for a purpose.

The pictures on pages 10 and 14 are good illustrations of bleeding. *Why do it?*

Well, it isn't because we had a big picture that wouldn't fit on one page. As we make up CHEMICAL PROCESSING each month, we use these "bleed pictures" (and other artistic devices) for three primary reasons. First, they make the magazine more attractive (and easier to read). Second, they give a better idea of just what is being illustrated (you can see more). And, third, they capture the scope, the breadth, the bigness of our \$60 billion chemical industry.

This broadening of scope is not confined to the makeup of the magazine. To serve you better, our editors constantly broaden their scope of operations in the field . . . traveling tens of thousands of miles each year for stories and pictures. Then, too, since last December the scope of our circulation has increased. Ten thousand more readers are receiving CHEMICAL PROCESSING each month — men like yourself, responsible for the management of the industry.

Bleeding in the gutter — with a big picture — is just an outward indication of the increasing scope, depth, and breadth of helpful editorial in CHEMICAL PROCESSING.

Roy G. Helsing

EDITORIAL PRODUCTION

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page
- The product directory, pages 222 to 224, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opp. last page

Highlights in this Issue

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THIS MONTH'S COVER

Our cover this month portrays the big decrepitation kiln in operation at world's largest lithium-producing plant (LCA), Bessemer City, N. C. Unit plays a key role in the plant, which processes run-of-mine ore directly — bypassing need for flotation or other expensive ore concentration steps. Full story starts on page 10.

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Feb 1-2. Chemical Market Research Association, Meeting on Aromatic Chemicals, Pittsburgh.

Feb 7-9. The Society of the Plastics Industry, Inc., Eleventh Annual SPI Reinforced Plastics Division Conference, Hotel Chalfonte-Haddon Hall, Atlantic City.

Feb 26-29. The American Institute of Chemical Engineers, Statler Hotel, Los Angeles.

Feb 27-29. Second Annual Electronics Conference and Exhibit, The American Management Association, Hotel Commodore, New York.

Mar 8-9. The American Institute of Electrical Engineers, Conference on Electrical Engineering as Applied to the Paper and Pulp Industry, University of Florida, Gainesville.

Mar 12-16. 12th Annual Conference and Corrosion Show, the National Association of Corrosion Engineers, Statler Hotel, New York.

Apr 9-12. 25th National Packaging Exposition, The American Management Association, Convention Hall, Atlantic City.

Apr 10-11. Symposium for Management on Applications of Analog Computers, Midwest Research Institute, University of Kansas City, Kansas City, Mo.

Apr 10-12. The Metal Powder Association, Twelfth Annual Meeting and 1956 Metal Powder Show, Hotel Cleveland, Cleveland.

Apr 18-20. National Industrial Research Conference, Armour Research Foundation of Illinois Institute of Technology, Illinois Tech Campus, Chicago.

Apr 23-28. Chemical Progress Week, sponsored by Manufacturing Chemists' Association.

Apr 26-27. American Institute of Electrical Engineers, Instruments & Measurement Committee, Conference on Recording and Controlling Instruments, Bradford Hotel, Boston.

Apr 29-30. The Electrochemical Society, Inc., Mark-Hopkins Hotel, San Francisco.

May 6-9. The American Institute of Chemical Engineers, Roosevelt Hotel, New Orleans, Louisiana.

May 14-15. Chemical Market Research Association, Biltmore Hotel, New York.

May 14-17. American Petroleum Institute, Division of Refining, 21st Midyear Meeting, Montreal.

May 14-17. Design Engineering Show, Convention Hall, Philadelphia.

May 27-June 2. American Society for Testing Materials, Fourth Conference on Mass Spectrometry, Netherlands Plaza Hotel, Cincinnati.

June 5-8. The Material Handling Institute, Inc., All-Industry Exposition, Cleveland Public Auditorium, Cleveland.

June 11-15. Seventh National Plastics Exposition, The Society of the Plastics Industry, Inc., New Coliseum, New York.

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● **EASIER TO GET ON OR OFF**—Absence of cowl and other obstructions means easier and faster mounting and dismounting.

● **DYNAMIC BRAKING**—Greater safety on ramps, smoother stops, less wear on brake lining, greater protection for truck and load.

● **SEPARATE PARKING BRAKE LINKED TO DRIVER'S SEAT**. Automatically holds truck when driver dismounts—even on incline. On armature shaft—Independent of wheel brakes.

● **HYDRAULIC WHEEL BRAKES**—Finest available. Self-energizing, self-equalizing. Single point adjustment.

● **STRONGER STEERING AXLE**—Double-yoke construction and rubber mounting reduces road shocks and means smoother riding for operator and load.

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**American Cyanamid Company finds that all
supervisors will respect, understand,
participate in a properly designed . . .**

conference procedure for management development

By **MERRILL E. KILBY**
Director of Management Services
American Cyanamid Company
Bound Brook, New Jersey

The mechanics of the American Cyanamid Educational Program (for management development) aim at establishing a concept in the mind of the supervisor. For our purposes, when the individual has acquired a concept we mean that, first, he has intimate, habitual, intuitive familiarity with the subject; second, systematic knowledge of the subject; and third, an effective way of thinking about the subject.

Where does this lead? In order to establish a concept, the individual must acquire the *knowledge about* the subject. This being done, we then have to guarantee that the individual uses it and gradually becomes proficient in the *knowledge of acquaintance* by following up, in the line organization, what has been presented.

Thus the conference series is aimed at presentation of "*knowledge about*" as a preliminary to having the people ready to acquire their own "*knowledge of acquaintance*." This, of course, is best done by having their daily routine supplemented by all orders, communications, and policies being expressed in the terms they learned in their conferences.

Mr. Kilby received his Bachelor of Science degree in Chemical Engineering from the University of Maine. At graduation, he joined Scott Paper Company as a student engineer. Mr. Kilby has been with American Cyanamid since 1932, and has held many positions with the company. Immediately before his present position, he was director of training. He has been active in many societies devoted to management and education, participating both as speaker and leader in many seminars of the Society for the Advancement of Management, the American Management Association, and the YMCA Industrial Conferences at Silver Bay.

One of the divisions of American Cyanamid Company began an experiment nine years ago to improve supervision using the group conference method. This pilot group consisted of a vertical segment of the organization comprised of two members of each of six levels of the organization. The group met once a week for a period of twenty-six weeks under carefully controlled conditions. It was led by an industrial psychologist. Sociometric tests and procedures were used to furnish a reliable evaluation of the interaction of the members and the changes in relationships which resulted as the meetings progressed.

Using the pattern developed in this pilot group, approximately eighty groups have participated in somewhat similar conferences over the past years. The membership of these groups included supervisors from every department found in the average industrial organization from the top to the bottom. Group size averaged twelve. Sometimes as high as three echelons of the organization were included in one group.

(Please turn to page 219)

Cyanamid has observed many results of the conference method during the past nine years.

Of the many changes which may occur in an individual . . . the most important is the CHANGE IN HIS PERCEPTION—seeing things as others see them. This strengthening in the individual leads to several improvements:

First—each participant is more aware of and receptive to the ideas of others.

Second—each participant has more skill in interpersonal relationships.

Third—all participants develop a pattern of "organizational" behavior.

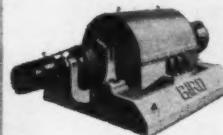
And, most important—conference relationships have a "carry-over" from the conference to the actual work situation.

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2 LaBour No. 20 Type DLP pump unloading tank cars of alum and 96% H₂SO₄ in a chemical plant. Before installing a Chempro Style WLZ seal, this pump was repacked weekly. The Chempro seal has given more than 11 months of trouble-free service.

3 Worthington 4CNG-84 pump operating on 94% H₂SO₄ in an oil refinery. A No. 175 Chempro Style WLZ seal solved the packing problem after it was installed more than seven months ago and is giving 100% leak-free service.

*Based on user figures.

†Patented

Write for new Chempro Seal Bulletin CP551

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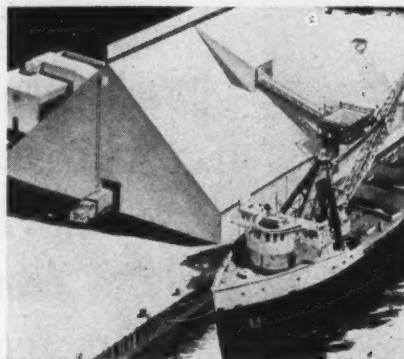
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*what you can expect in
next month's issue . . .*



Handless handling

When International Salt put in its ultra-modern warehouse for the Chicago area, it employed as nearly an automatic handling system as could be built. Unique warehouse design permits millions of pounds of salt a year to be moved from boat to bagging machine — or bulk shipment — under push-button control. Only mobile equipment in this warehouse is one tractor-shovel. CHEMICAL PROCESSING takes you on a guided tour of the warehouse in next month's "New Solutions" section.

**Black liquor scrubs gas
in recovery system**

The venturi scrubber handling flue gas from Thilmany Pulp and Paper Company's recovery furnace uses black liquor instead of water as the scrubbing medium. One big advantage of method is that the black liquor, entering scrubber (from evaporators) at 42% solids, is concentrated to 62% by direct contact with the flue gas . . . which means a saving of more than 3000 lb steam per hr. Besides, chemicals in the flue gas are trapped in the black liquor — right where they're wanted. Chemical recovery runs about 90%.

Full details are given in a March "New Solutions" feature written by Assistant Editor Ted Meinhold from information supplied by P. H. West of Thilmany.

**Methyl vinyl ketone —
reactive yet stable**

A "Materials" feature story next month discusses highly-reactive methyl vinyl ketone, being used as a co-monomer in manufacture of a number of items, from plastics to paints. Story points out that the chemical reacts to form bactericides, drug products, and chemical specialties as well.

Although MVK is extremely reactive, it can be stored for appreciable time if stabilized. Proper stabilization will not affect reactivity however.



**Quick, Watson,
the pH meter!**

If you enjoy detective stories, next month's *case history* in the "Instrumentation" section is your dish. In an unusual story based on a technical report by John Price and Kenneth Stuart of Colorado Fuel and Iron, CP editors have retraced the steps used in tracking down an optimum control point. While the information is based on development of a continuous process for producing diammonium phosphate, techniques discussed may help sleuths fit clues to their own problems.

**Keeps kiln dust
from atmosphere**

How Cadillac Asphalt Paving Company, Detroit, traps dust from a rock and sand kiln is told in an "Engineering & Maintenance" highlight next month. Company uses a multiple-tube cyclone collector and then a wool-felt reverse-jet unit to handle 28-31,000 cfm of air carrying a dust loading of 8-16 grains per cubic foot. About 94% of the dust is smaller than 10 microns (kiln reheats rock and sand that has been dried previously).

Here's a quick preview
of features you'll find
in March's Chemical Processing



"Evaporator Acres"
at Kaiser

Economy, compactness, and minimum fouling are features of multiple-evaporator set-up at Kaiser Aluminum & Chemical Corporation's Baton Rouge alumina plant. Associate Editor Gordon Weyermuller toured the installation on one of his southwestern junkets, came up with the story on how the units are arranged and operated to evaporate a million lb of water an hour — a "New Solution" in March.

Glass-coated smokestacks fight corrosion

You may have asked yourself the question, "Why doesn't someone do something about the toll that acid-vapor corrosion takes of steel smokestacks?" If you have, be sure to see the "Corrosion Control" feature article in March. It describes glass-coated steel smokestacks, tells how they were developed, and points out how they can be used to advantage.

April issue to have summary of chemicals new in '55

Listing of chemical materials introduced in 1955 — with brief descriptions of each — will appear in April CP. We've incorporated some new ideas in presentation that should make the section even more useful than the one published last year. Look for it in April.

PERKIN

Announces

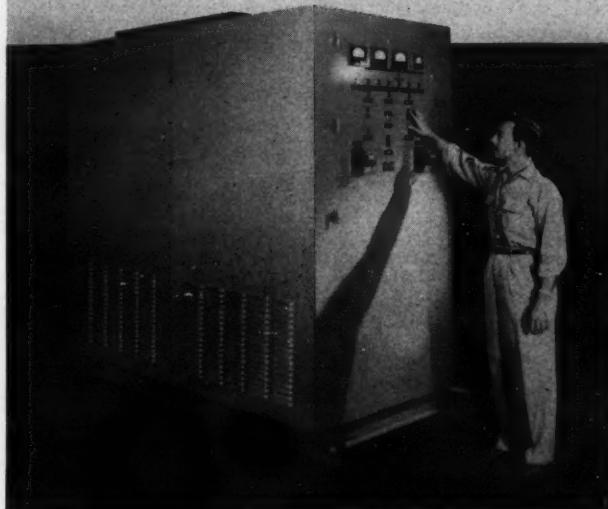
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World's largest lithium producing plant has been on stream since early 1955. By processing large quantities of run-of-mine ore directly, plant . . .

by-passes need for ore concentration

**TED F. MEINHOLD, Assistant Editor
with R. L. NIELSEN, Plant Manager
Lithium Corporation of America, Inc.**

In operation since January 1955, world's largest lithium plant produces lithium from low-grade spodumene ore without using expensive ore concentration steps. Run-of-mine ore ($\text{LiAl}(\text{SiO}_3)_2$), containing about 1.0 percent lithium, is trucked to plant from nearby company-owned deposits and processed directly, eliminating need for flotation or other ore concentration operations. Located at Bessemer City, North Carolina, plant is owned by the Lithium Corporation of America, Inc., and cost about \$7 million. Plant produces both lithium carbonate and lithium hydroxide. Anhydrous grade sodium sulfate is also produced as a by-product.

Abundant supply of ore in nearby King's Mountain area and resulting low transportation costs were key factors in selecting the Bessemer City site. In order to make the overall operation economically feasible, the plant was designed to process greater quantities of ore than had heretofore ever been attempted in the lithium industry. To meet this requirement, engineers had to install some of the largest and most modern equipment that could be had.

Typical of this, is the machinery used for ore handling and processing. Incoming ore passes through a 30"x18" jaw crusher capable of crushing 55 tons of ore per hour. Large chunks of rock are reduced down to 4" and smaller in this unit. Passing through a 3"x8" single-deck vibrating screen, these chunks are further reduced to about $\frac{1}{2}$ " in a No. 636 Hydracone crusher before being stockpiled.

A 48"-diameter rotary table feeder feeds the stockpiled ore onto a 236'-long Link-Belt conveyor, which carries it to a 11½"-diameter x 250' decrepitation kiln. The latter is combination gas-oil fired, brick-lined, and revolves at about one rpm. Unit converts the ore into a form from which the lithium can be extracted by treatment with a suitable acid.

Temperature of ore leaving kiln is about 2000°F. The decrepitated product is then cooled to 150°F in a 10'-diameter x 200' rotary cooler. Cooling is accomplished by spraying water over outer shell of cooler. Leaving the cooler, ore is stored in bins prior to further processing.

From the bins, the ore is fed into a 9'-diameter x 15' ball mill, where it is reduced to -100 mesh. Unit operates at 17 rpm and uses balls ranging in size from 1" to 4". A 3-phase, 200-rpm, 800-hp synchronous motor drives the mill. The fine ore is next mixed with 66° baumé, sulfuric acid and sent to an 8'-diameter x 140' roaster kiln where lithium sulfate is formed. Kiln temperature is about 450°F.

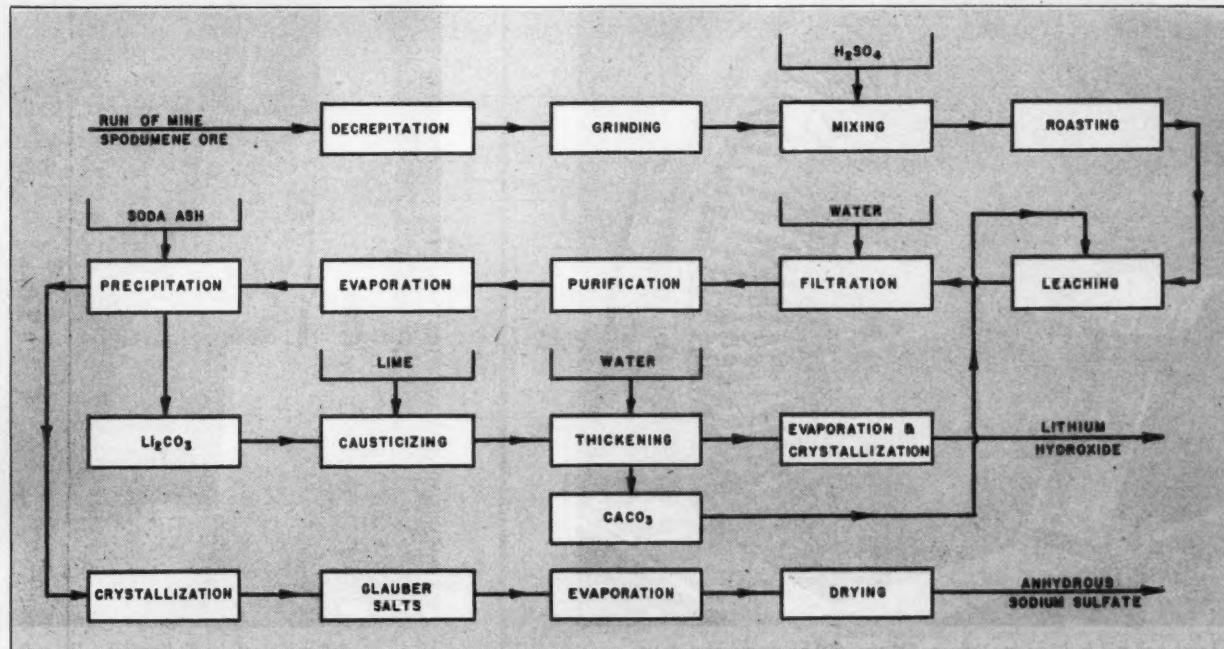
This completes only the initial stages of the overall process. Later, the material is subjected to leaching, filtration, evaporation, crystallization, and other operations to obtain the purified lithium products.

(Ore processing equipment used in plant is product of Allis-Chalmers, Dept. CP, Milwaukee 1, Wisconsin . . . or for more information check CP 3391 on form opposite last page.)

(Please turn to next page for more pictures of this process)

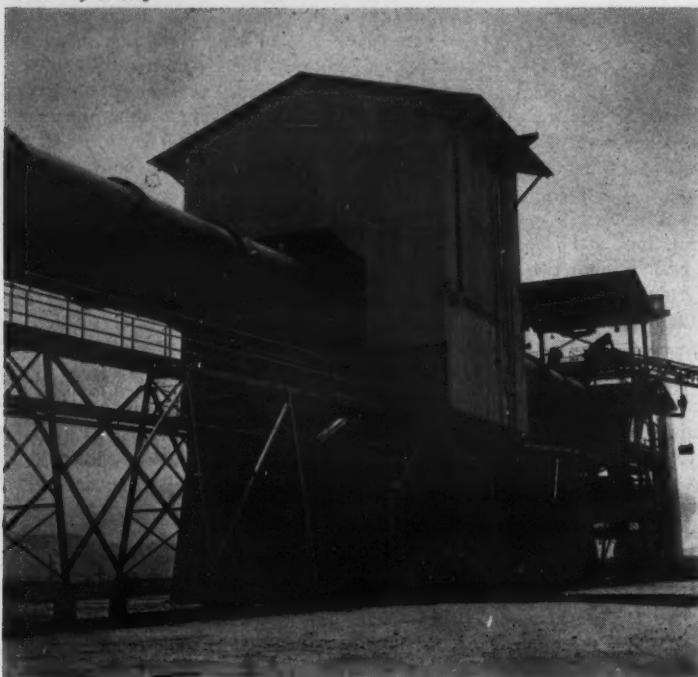
Simplified flow diagram ill-
ustrates overall operations
at lithium plant

View looking underneath
decrepitation kiln towards
ore stockpile. Conveyor (arrow)
feeds stockpiled
ore to kiln
CP Staff Photo



More Views of Lithium Corporation's Plant (see story on preceding page)

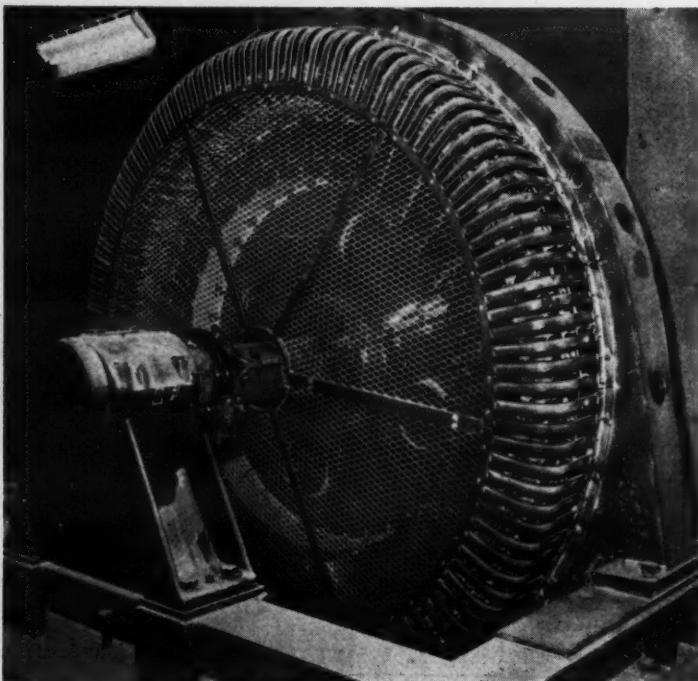
Photos by CP Staff



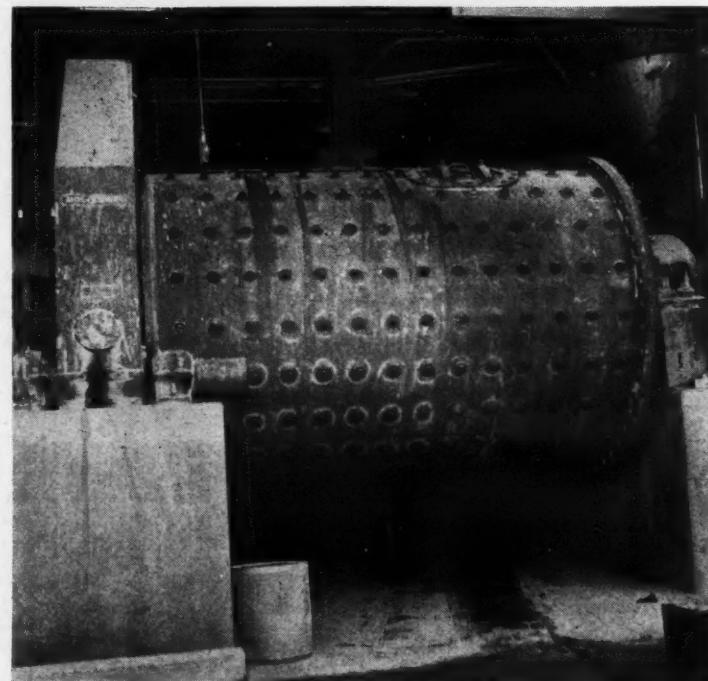
Large 11½'-diameter x 250' kiln converts spodumene ore to acid soluble form



Table feeder feeds crushed ore onto 236' conveyor for trip to decarbonation kiln



Large ball mill is driven by 3-phase, 200-rpm, 800-hp synchronous motor



Ball mill measures 9' diameter x 15', reduces ore to -100 mesh

**Channel Master uses evaporators to recover
zinc plating solution . . .**

side-steps cyanide waste disposal

**System recovers drag-out from 11,000 gal of
plating solution, has maximum capacity of 160 lb
sodium cyanide per day**

In a departure from conventional procedures in the plating field, Channel Master Corporation, Ellenville, New York, is using a double-effect evaporator to recover zinc plating solution — thereby eliminating problem of cyanide waste disposal. System recovers the drag-out from about 11,000 gal of plating solution and has maximum capacity of 160 lb sodium cyanide per day.

Rated capacity of evaporator is 750 lb water per hr. Waste plating solution is collected in a 300-gal tank from overflow of first of four tanks following plating bath. Rinse water normally cascades from rinse tank to rinse tank, countercurrent to movement of plated products. Flow rate ranges from $\frac{1}{2}$ to $1\frac{1}{2}$ gpm.

Concentration of sodium cyanide, zinc cyanide, and sodium hydroxide in first tank may be as high as 1.25 to 1.50 oz per gal of water, but is usually less than half this much.

Contaminated rinse water is pumped from holding tank through a preheater into the first effect evaporator tubes. Low-pressure steam in steam chest raises temperature of solution to about 180°F (low enough to prevent conversion of cyanides to carbonates), as determined by vacuum maintained in first effect. The condensing steam is recycled through preheater. Rinse water evaporated in first effect is used as heating medium in steam chest of second effect, where higher vacuum reduces boiling points to 115°F. To



Enough water is evaporated in equipment to increase final concentration of cyanides up to 12 to 15 oz per gal. First-effect evaporator and separator are in foreground

keep entrainment down to 5 ppm, vapor head of each effect is equipped with a wire-mesh demister. Rinse water collected as condensate in first effect continues on to second effect.

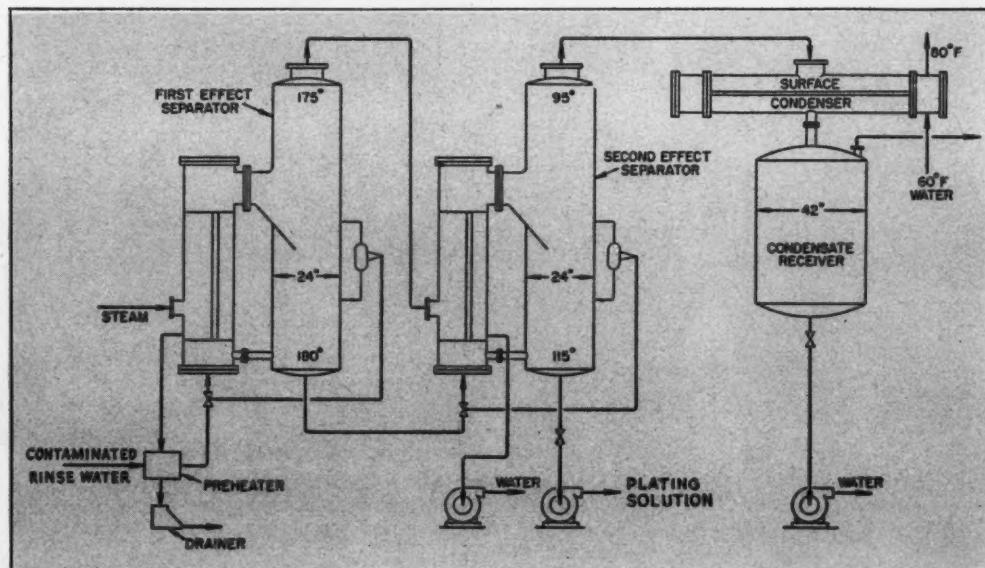
Three products are removed from the second effect. Two of them are distilled water: 1) condensate from steam chest, and 2) condensed vapor from the separator. Latter passes into a surface condenser and then into condensate receiver. Distilled water from steam chest and receiver are pumped independently into a 300-gal holding tank and re-used as plating rinse water. The third product, condensate in bottom of second effect separator, is plating solution of about the same composition as the original. It is pumped to another 300-gal tank.

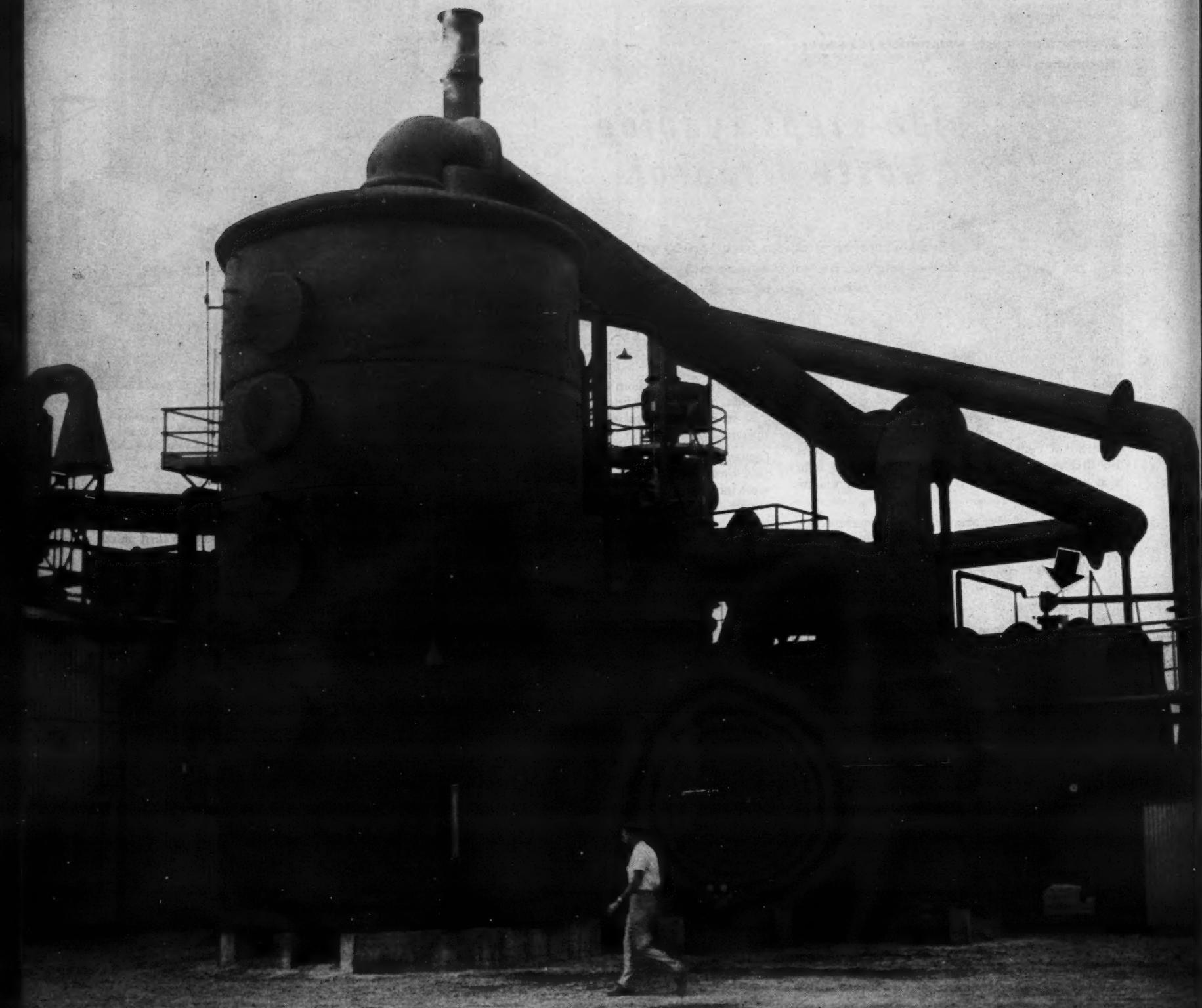
Operation of the evaporators is simple and automatic. Circulation is maintained by thermal difference. Steam input is automatically regulated by float control operating on solution level in holding tank. Solution level in separators automatically regulates flow of waste rinse water into evaporators. Temperature also is automatically maintained.

Cost 18c/lb NaCN recovered

Enough water is evaporated to increase final concentration of cyanides up to 12 to 15 oz per gal. Op-
(Please turn to page 18)

◀ **Rated capacity of double-effect evaporator in plating plant is 750 lb water per hour**





Spray method of sulfur feeding, dual power setup, and evaporative cooling are used in Davison's —

streamlined sulfuric acid plant

Carefully designed and fabricated unit is attractive in appearance, has high production and low maintenance

By GORDON WEYERMULLER, Associate Editor
with J. L. COGBILL, Sulfuric Acid Plant Supervisor
Davison Chemical Co., Div. W. R. Grace & Co.,
Joplin, Missouri

Davison Chemical's new sulfuric acid plant at Joplin, Mo., not only is an efficient plant — due to a number of features — but is attractive in appearance. One reason is that the plant was designed to take advantage of any new ideas. Also, proper welding and other fabrication procedures were followed closely to assure minimum downtime and long equipment life. Plant is largely automatically operated by two men per shift.

The Monsanto-Leonard unit, which uses vanadium catalyst, went into production on Dec. 18, 1954. Although designed for 200 tons per day, it has operated at a rate as high as 229 tons per day. Rate of production can be varied from 50 up to 229 tons per day with high efficiency. Yield averages about 98.5% conversion. Plant has required only a minimum of maintenance.

Sulfur feeding — Sulfur used in the plant comes from Texas, where it was recovered from sour gas. Filtered liquid sulfur is fed into combustion cham-

ber by a Whirljet stainless steel spray nozzle, which has a capacity of 6 gpm of molten sulfur. Use of this system permits plant to start up on 50 psi steam. This method eliminates the use of a sublimer, extra blower, and a constant level tank.

Dual power setup — A dual power setup is used throughout the plant so that either electricity or steam can be used. This permits uninterrupted production in the event of a power failure. Also, plant can start up in one hour after a six to eight hour shutdown. An example of dual power setup can be seen in one of the photographs, showing Worthington steam-driven and electrically-powered pumps used with sulfuric acid cooler.

Evaporative cooling — Acid is cooled by use of an evaporative cooler made by National Engineering and Mfg. Co. With this unit, acid is cooled by passing it inside of coils over which cold water is running. A forced air stream evaporates water from surface of coils. Air is principal coolant — negligible makeup water is needed.

Materials of construction — Cast iron acid lines and coolers are used throughout the plant. For oleum, Schedule 80 seamless carbon steel pipe is used. Acid mixing boot, where water is added to 98 and 93% sulfuric, is made of Duriron.

Protective coating — One important factor in the excellent appearance of the plant and the absence of corrosion is the black bituminous coating used on the vessels and lines. This coating was chosen since it has been used and shown to be satisfactory in a number of other Davison sulfuric acid plants.

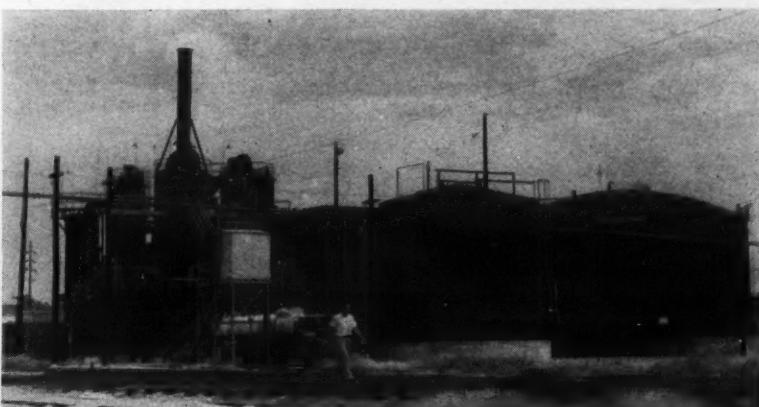
Acid of 98% strength is diluted to 93% and used in the manufacture of fertilizers. Some stronger acid is shipped out to a neighboring plant as 40% oleum. Some sulfuric is also shipped to other plants of the company.

(Sulfuric acid plant was fabricated by Nooter Corp., Dept. CP, 1400 S. Second St., St. Louis, Mo. . . . or check CP 3392 opposite last page.)

(Whirljet spray nozzle used for sulfur feeding is product of Spraying Systems Co., 3216 Randolph St., Bellwood, Ill. Check CP 3393 opposite last page.)

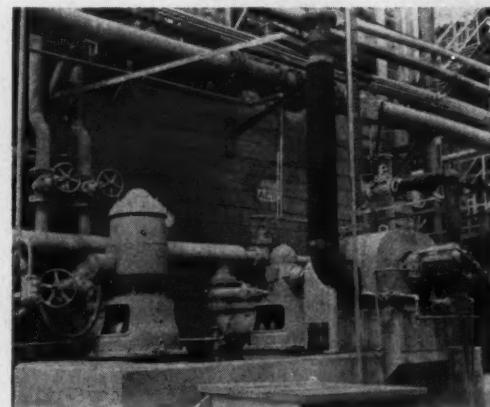
(Fendix 3000 AC402 bituminous coating used on sulfuric acid plant is product of Daubert Chemical Co., Dept. CP, 333 N. Michigan Ave., Chicago, Ill. . . . or check CP 3394 on form opposite last page.)

Dual power system for evaporative cooler, with electrically-powered pump on left and steam-driven pump on right
CP Staff Photo



Coating system on plant helps maintain attractive appearance and provides protection from corrosion. Arrow indicates position of spray nozzle used for sulfur feeding
CP Staff Photo

Evaporative cooler for sulfuric acid may be seen directly behind tank truck
CP Staff Photo





Use of fork lift trucks at Globe Chemical to handle carboys of acids four at a time —

saves \$10,560 per year in labor

The trucks are also used for handling dry chemicals

FRANK E. McELROY, Assistant Editor
with L. J. GROTE, President
The Globe Chemical Co., Inc., St. Bernard, Ohio

Problem: Over 100 tons each of corrosive acid and dry chemicals are unloaded, stored, and shipped each week at Globe Chemical in St. Bernard, Ohio. Globe not only manufactures metal-treating and cleaning compounds, but is a large chemical jobber. They have to handle these chemicals quickly, safely, and economically.

Acid is received in tank cars and unloaded by pipeline to bulk storage. Previous method of filling and storing 13-gal acid carboys and 20-gal and 55-gal stainless drums required three men. The same number of men were required when loading

delivery trucks: one man at storage area, one transporting carboys with a 2-wheel truck, and one inside truck.

When unloading dry materials, it took seven men: two inside box car, three hand-trucking the bags and drums, and two stacking material in storage. Average unloading time for one car was eight hours.

Solution: Early in 1954 two fork lift trucks were purchased: a gasoline-powered unit to handle carboys, and an electric-powered unit to handle dry chemicals. Although they can be used interchangeably, the former was fitted with a custom-made carboy-handling fork. This was fabricated from $\frac{1}{2}$ " plate and is $12\frac{1}{2}$ " wide and three feet long. Mounted slightly off center, fork will accommodate two carboys at one time and also fits a special pallet that has a capacity of four carboys.



Fig 2—Truck picks up two carboys from filling line

Pallet construction permits stacking in tiers, even though carboy necks protrude from protective wood box (see Fig 3). Dimensions of pallets are 36×42 " and 10" in thickness.

System now in operation requires one man to fill carboys with acid from storage tanks and to push them down a dead-roller conveyor. Fork lift truck picks up two at a time (Fig 2) and takes them to loading platform or storage. Here — using the pallet — carboys are stacked two or three high (See opposite page).

For dry materials, two men make up pallet loads inside box car. These consist of 18 to 20 bags, four 55-gal drums, or 16 100-lb drums. The electric truck takes loaded pallets to storage, stacks them four high.

One important feature of the trucks is their Hi-Lo Stack uprights for lifting. The 97" max fork height and $66\frac{1}{2}$ " overall height down, together with $47\frac{1}{2}$ " of free lift, allows trucks to tier up

(Please turn to next page)

cost comparison of old and new methods of handling acid carboys and dry chemicals

Acid Carboys	Old	New	Dry Chemicals	Old	New
Number of men needed for storage (4 hr/day)	3	1	Number of men needed	7	3
Number of men needed for loading (4 hr/day)	3	3	Average hours required to unload box car	8	4
Total number of men (full 8 hr)	3	2	Man-hr required per box car	56	12
Total man-hr/year (5-day week, 50-week year)	6000	4000	Number of box cars/week	2	2
Savings (man-hr/year)	<u>2000</u>		Total man-hr/year (50 weeks)	5600	1200
			Savings (man-hr/year)	<u>4400</u>	
Total man-hr saved per year			6400		
Average hourly rate	\$1.65				
Total direct labor savings per year			\$10,560		

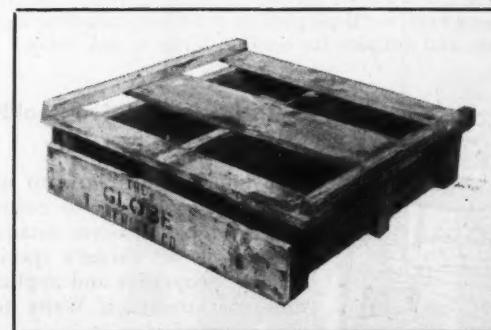


Fig 3— 36×42 " pallet is used to stack 13-gal acid carboys. It's thick enough to rest on wood box around carboy, and yet allow enough space to protect the neck.

COAL TAR + EPOXY = TARSET®

How Can YOU Use this Important New Protective Coating in Your Plant?

Perhaps no other protective coating in the world today combines the broad corrosion-resisting properties and relative low cost of newly developed Pitt Chem "Tarset." A unique combination of two proven corrosion-fighters—coal tar pitch and epoxy resin—Tarset offers unusual resistance to most salts and acids, crude oil and petroleum products, and to general industrial atmospheres.

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In the petroleum industry, Tarset has already proved its ability to stop severe corrosion caused by salt water and sulphur compounds in crude oil storage.

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NEW SOLUTIONS of processing problems

Material handling at Globe

(Continued from preceding page)

to four pallets high, and still enter delivery truck doors.

Results: Globe's records tell the story of how well the new method's paid off. An average of 6400 man-hours are saved annually—a net labor saving of \$10,560 per year. The comparison of "before" and "after" statistics give full details of this saving. (See table, page 17).

(Clipper 2024 fork lift trucks are made by Clark Equipment Company, Dept. CP, Battle Creek, Mich. . . or for more information about this equipment reader may simply check CP 3396 on convenient Reader Service slip which is located opposite last page).

• • •

Recovering plating solution

(Continued from page 13)

erating experience indicates a steam consumption of 90 lb of 15-psi steam per lb of sodium cyanide recovered. Ejector unit used with evaporator requires an additional 50 lb at 90-100 psi. About 500 gal of cooling water at 60°F are needed for each lb of sodium cyanide recovered. With steam at \$1 per 1000 lb and cooling water at 7c per 1000 gal, this adds up to 18c per lb of sodium cyanide recovered. This figure includes recovery of zinc cyanide and sodium hydroxide. Total labor is less than one man-hour per 8-hr shift.

If the cyanide were disposed of by chlorination the cost of chemicals alone would be about 60c per lb of sodium cyanide destroyed. To this must be added cost of replacing loss of sodium cyanide, zinc, and sodium hydroxide. Economics realized with the recovery system at Channel Master are expected to result in quick amortization of the equipment.

(Buflovak double-effect evaporators are product of Buflovak Equipment Division, Blaw-Knox Company, Dept. CP, Farmers Bank Building, Pittsburgh, Pa. . . or for more information check CP 3397 on convenient Reader Service slip which is located opposite last page.)

This month's Processing and Engineering Data section starts on page 208

THE SURFACE IS IMPORTANT!

In heat exchange applications, the condenser tube surface is vitally important. By increasing the surface area, heat duty is increased, costs reduced and on-stream time greatly lengthened.

Wolverine Trufin* Type S/T will produce this end result! Type S/T obtains its increased surface area from its fins which are squeezed directly from the tube wall. Because of its extruded fins, Trufin packs more heat transfer surface into every foot of tube—steps up capacity by as much as 2½ times over prime surface tube. Trufin makes it possible to design smaller, more effective heat exchangers and condensers. When retubing with Trufin Type S/T you obtain a much greater heat transfer surface area and thus can increase the capacity of your unit.

Since its fins are actually a part of the tube wall, they cannot shake loose because of vibration, thermal shock or varying pressures. Under the most severe operating tests, Trufin has proved conclusively that it withstands fouling for longer periods than does prime surface tube. Trufin-tubed units go on-stream and stay on-stream. Efficiency is constant, costly maintenance time reduced.

Trufin Type S/T can be directly substituted for plain tube with conventional tools and methods. The ends of the tube are left without fins and the tube is designed with the outside diameter of the plain end slightly larger than the O.D. of the finned end. This allows the tube to be inserted into a bundle and rolled into the tube sheet by regular methods.

Yes, surface is important and Trufin has the surface you need. Next time you order condenser tube specify Trufin Type S/T. It is available in a wide range of sizes and alloys of copper and aluminum. Write, too, for your copy of the Wolverine Trufin Opportunity Book. It's packed with valuable information.

WOLVERINETUBE, 1469 Central Avenue, Detroit 9, Michigan.

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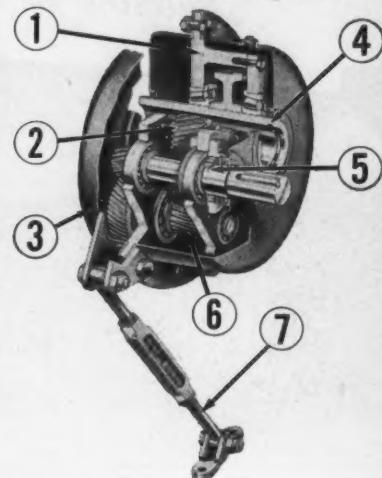


PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.
EXPORT DEPARTMENT, 12 EAST 40TH STREET, NEW YORK 16, NEW YORK



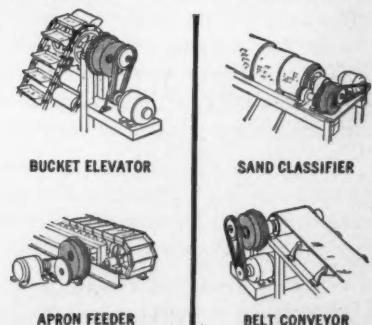
This is Wolverine Trufin* Type S/T—the integral finned condenser tube with the extended surface that means increased performance and economy.

These famous FALK
"In-built" factors
mean long life and
dependability...



- 1 **All-steel Frame**, with more than double the rigidity of iron, supports all rotating elements.
- 2 **Precision Helical Gears**, designed and machined by Falk, rated to AGMA standards.
- 3 **Pressed Steel Housings**, whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.
- 4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.
- 5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.
- 6 **Positive Lubrication**, continuous direct dip of revolving elements at all speeds.
- 7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

A FEW TYPICAL APPLICATIONS



FALK

a good name in industry

posite last page

PRIME SURFACE TUBE

Wolverine manufactures prime surface tubing in two metals—copper, copper-base alloys and aluminum in a wide range of sizes.

DUPLEX PRIME SURFACE TUBE

Here's a tube designed to handle two types of corrosive attack simultaneously. It is composed of a tube of one metal and a liner of another. The combination can be any alloy you need to meet special conditions.

DUPLEX TYPE S/T

This tube also is designed for specific corrosive conditions. But, like Trufin, it has integral fins—will boost heat transfer efficiency. It can be used instead of prime surface tube.

TRUFIN TYPE L/C

A high-finned, lightweight aluminum tube is mechanically bonded to an interior liner of the alloy which best beats your corrosion hazard. It provides maximum heat transfer and trouble-free performance at low cost.

U-BEND PALLETS

This new Wolverine idea cuts time, reduces storage problems, and saves money. U-bend condenser tubes—either finned or prime surface—are arranged in a disposable box-type pallet in the exact order you specify. All you have to do is feed them directly from pallet to unit.

FIELD ENGINEERING SERVICE

This is a Wolverine "extra"—a staff of highly-skilled tubing technicians. You can get experienced help in solving problems dealing with alloys, corrosion, design or fabrication.

*REGISTERED U.S. PATENT OFFICE.



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Division of Calumet & Hecla, Inc.

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BACKED BY EXPERIENCE

In addition to Trufin* Type S/T, Wolverine has also pioneered in the development of a complete line of condenser tubes for the processing industry. Such a line-up could only come from years of experience—the kind of experience that studies an industry's needs and then develops products to meet those needs.

Illustrated are condenser tubes designed to bring new efficiency to every type of operating condition. Each is the product of Tubemanship—Wolverine's way of combining experience, research, rigid quality control and sound engineering into every foot of every tube.

Look these products over—study them in relation to your own operating needs—and then specify the one that will do the job. Wolverine's Condenser Tube Catalog contains complete size and alloy information. Write for your copy today!

**WOLVERINE TUBE, 1469 Central Avenue,
Detroit 9, Michigan.**

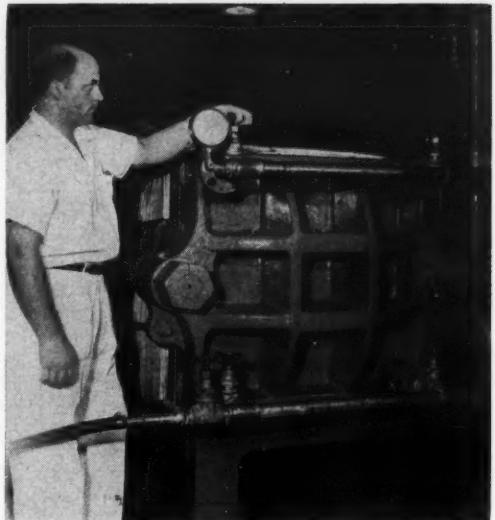
Wolverine Trufin available in Canada through the
Unifin Tube Company, London, Ontario.

NEW SOLUTIONS of processing problems.

**Increased flexibility of service
given filter press with no
product contamination . . .**

non-rising spindle, stainless gate valves permit wide range of solvents, assure cleanliness

Filter press, serving in semicommercial antibiotic development section of Abbott Laboratories, North Chicago, Illinois, achieves greater flexibility through use of non-rising spindle, stainless steel gate valves. Stainless steel construction permits handling of the variety of corrosive solvents which are used in an



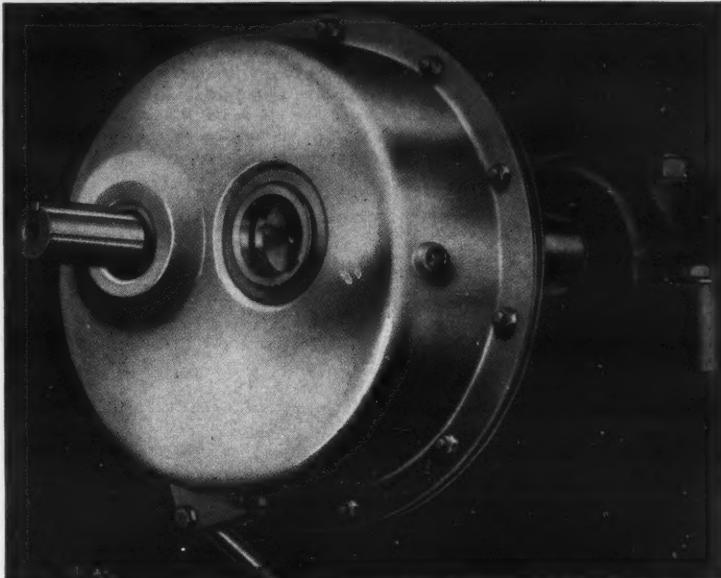
CP Staff Photo
Non-rising spindle, stainless steel gate valves on 36" filter press at Abbott Laboratories

antibiotic pilot plant. Non-rising spindle assures absence of contamination when different compounds are filtered since stem does not rise into packing and washing is complete.

Filter is 36" Lithcoted, plate-and-frame Sperry press with a hydraulic closure. Valves are 1½" 316 stainless steel, screw-in-bonnet, gate valves. Seat is integral with body, so that no corrosion cell forms in seat ring threads. Carbon content of metal is held below 0.07% to assure against carbide precipitation at grain boundaries as well as increasing corrosion resistance. Wedge is raised or lowered by spindle threads as valve is opened or closed.

(Non-rising spindle gate valves are a product of Jenkins Bros., Dept. CP, 100 Park Ave., New York 17, N.Y. . . or for more information check CP 3398 on form opposite last page.)

For more information on product at left, specify CP 3399 . . . see information request blank opposite last page.



**FALK
ALL-STEEL
Shaft Mounted Drives—
simple-compact-rugged-efficient**

Created specifically for the vast number of applications demanding a sturdy and compact speed-reducing unit for direct mounting on the driven shaft, the new Falk all-steel Shaft Mounted Drive is built to give long service life at substantial savings of space, time, power and maintenance costs!

This efficient helical-gear drive, latest in the unmatched list of Falk precision-gearing achievements is an ingenious modification of the time-tested Falk Motoreducer design which has held, for more than 20 years, recognized leadership in this branch of highest-quality power transmission . . . It complements and completes the world-famous Falk line of reduction units covering the entire range of industrial applications.

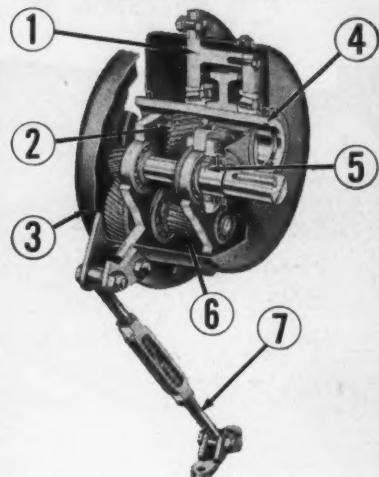
Investigate the Falk all-steel Shaft Mounted Drive. Write to Department 247 for engineering bulletin, including selection and dimension details.

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

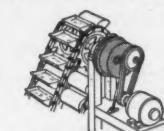
- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
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- Contract Machining

**These famous FALK
"In-built" factors
mean long life and
dependability...**

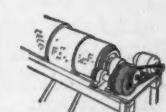


- 1 **All-steel Frame**, with more than double the rigidity of iron, supports all rotating elements.
- 2 **Precision Helical Gears**, designed and machined by Falk, rated to AGMA standards.
- 3 **Pressed Steel Housings**, whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismantling unit.
- 4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.
- 5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.
- 6 **Positive Lubrication**, continuous direct dip of revolving elements at all speeds.
- 7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

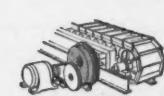
A FEW TYPICAL APPLICATIONS



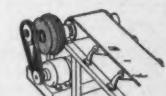
BUCKET ELEVATOR



SAND CLASSIFIER



APRON FEEDER

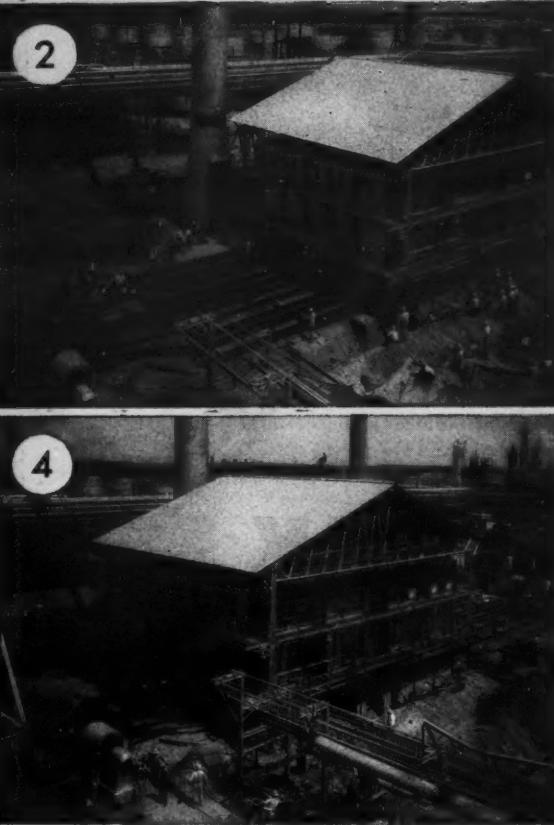
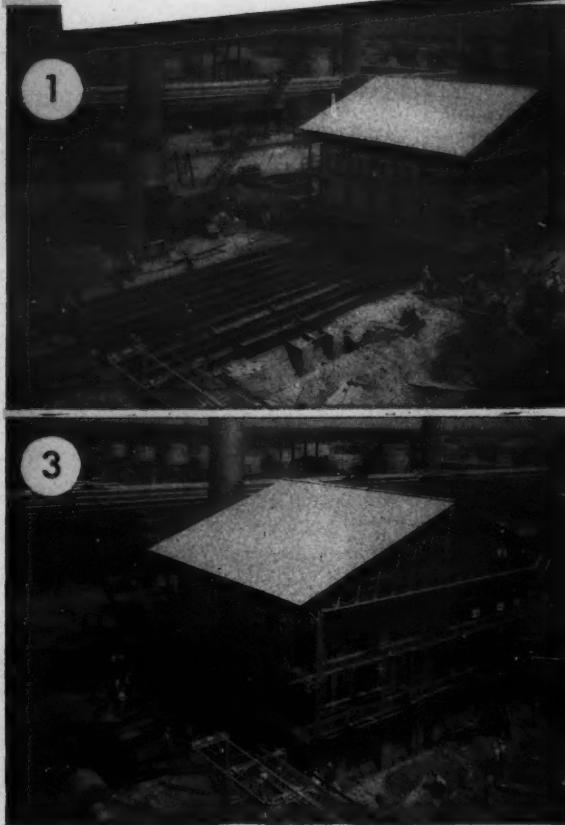


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When inquiring check CP 3400 opposite last page

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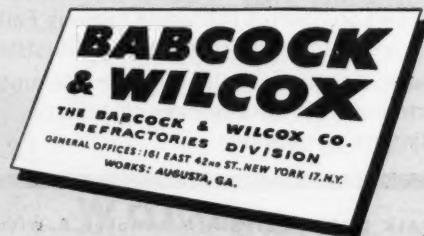
PHOTOS COURTESY THE LUMMUS COMPANY

Moving a 900 ton oil heater is no cinch, but it's a lot easier than budging one that weighs 1500 tons. This 600 ton difference stems from the use of *lightweight* B&W Insulating Firebrick in place of ordinary heavy firebrick in this portable oil heater.

Simplifying the moving job is only one of the advantages of B&W Insulating Firebrick . . . one more reason why The Lummus Company specified this lightweight brick for many portable heater installations.

Of even greater importance is the fact that B&W IFB store and conduct less heat. Thus they cool off fast, reduce down-time, make possible quick access to the

furnace for inspection. Installation costs are cut, too, because these lightweight brick can be cut, drilled or shaped with ordinary woodworking tools. What's more, these lightweight brick may be supported or anchored with ordinary carbon steel. There's no need to use expensive, heat-resisting alloys.



B&W REFRactories PRODUCTS—B&W Alumina Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick
B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment...
Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

When inquiring check CP 3401 opposite last page

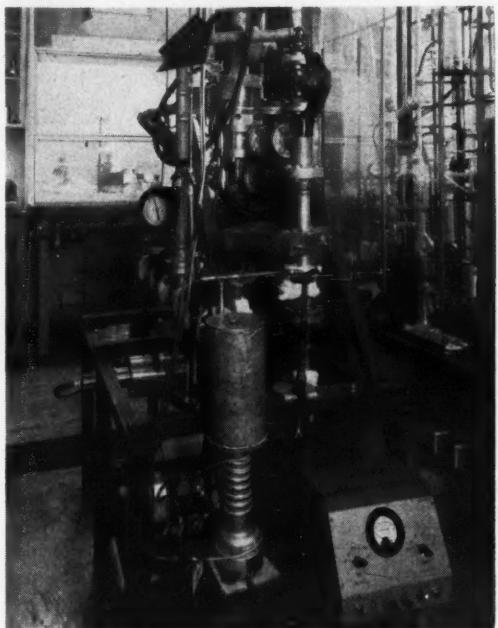
NEW SOLUTIONS of processing problems

Argonne National Laboratory uses canned motor-pump to handle NaK . . .

unit operates so smoothly in research work it can't be heard while running

In research work being conducted at Argonne National Laboratory, Lemont, Ill., a hermetically-sealed (canned) motor-pump is being successfully used to handle NaK. According to Dr. Bernard M. Abrahams, Senior Chemist in charge of the project, the motor-pump operates so well in the service that it can't be heard while running.

Research program was initiated to investigate suspensions of uranium compounds in NaK with the goal of developing a suitable uranium or plutonium



Canned motor-pump (arrow) is mounted at top of loop on experimental setup at Argonne National Laboratory

slurry that could be used as the fuel in power reactors.

A circulating loop was constructed in order to measure the flow necessary to maintain a uniform suspension of 40 to 59% (by weight) UO_2 in NaK. It was also desired to compare the power required to pump the dispersion with that needed for an equivalent volume of pure NaK.

The canned motor-pump is mounted at the top of the loop as shown in accompanying photograph. This was done so pump could be primed with essentially solid-free NaK. Pump can be mounted in any position. As shown, it is mounted upside down in this application. Loop is operated under a pressure of

15-18 psig so that the pump suction is not depended upon for priming.

Motor-pump, which has been in service at Argonne for about a year, is based on two design concepts. First of these is the fluid piston radial bearings. This consists of a tubular rotating shaft which is supported by fluid pressure so that it floats concentric with a stationary shaft bearing.

Second concept is the canned motor principle where an induction rotor rotates in fluid being pumped and is cooled by the same fluid. Motor stator windings are located outside of a nonmagnetic stainless steel shell which surrounds the rotor. With this construction, no packing seals are required and the rotating elements of pump and motor can be included in one hermetically-sealed shell. Rotor is clad with corrosion-resistant materials such as stainless steel, Inconel-X, Nichrome, or Hastelloy. Impellers are made of similar materials or for extreme corrosion conditions they can be made of titanium, tantalum, or zirconium.

At Argonne motor-pump handling NaK operates at a rate of 10 gpm, with 15' head. It has a one-hp motor. Another canned motor-pump is used for handling oil and others have been used in other services at Argonne. Pumps are capable of handling nonabrasive fluids with densities varying from that of gasoline to that of mercury. Temperature limits range from -100 to 1500°F, with operating pressures up to 2000 psi.

(General purpose canned motor-pump is product of Allis-Chalmers Mfg. Co., Dept. CP, Box 512, Milwaukee 1, Wis. . . or for more information check CP 3402 on form opposite last page.)

WE'RE LOOKING FOR CARTOONS!

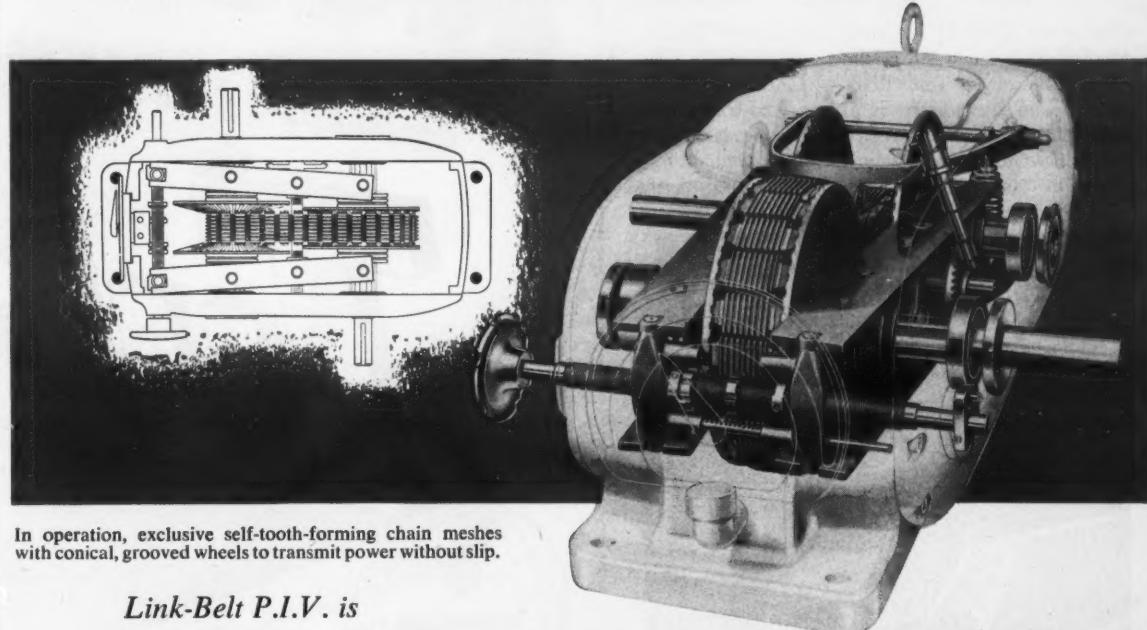
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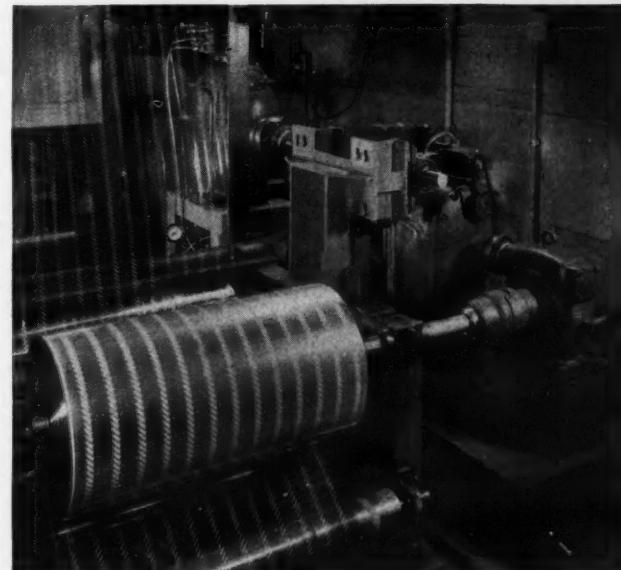
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Link-Belt P.I.V. drives are available in capacities from $\frac{1}{2}$ to 25 hp . . . in 8 sizes and 16 types for horizontal and vertical mounting. See your nearest Link-Belt office or authorized stock-carrying distributor, and write for Book 2274.



LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



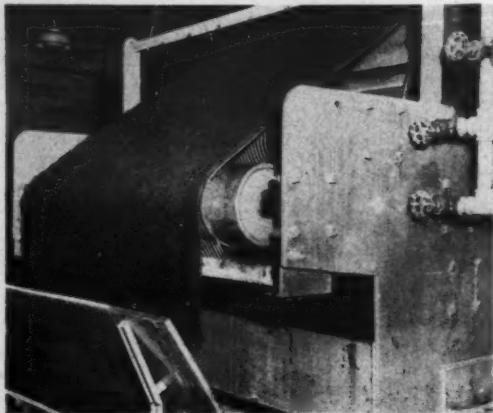
On two-color rotogravure press, Link-Belt P.I.V. Variable Speed Drives prevent the build-up of destructive tension in the printing of delicate plastic films and metal foils by controlling the speed of the dryer rolls and press rolls.

When inquiring check CP 3403 opposite last page

**No need to replace filter cloth
big advantage of vacuum filter
using coiled springs . . .**

non-clogging unit removes 50 lb/sq ft/hr of CaSO_4 from effluent at Cincinnati Chemical

One of the principal advantages of coil-type vacuum filter used in the waste treatment plant at the Cincinnati Division of Toms River — Cincinnati Chemical Corp. is that it is never necessary to change the filter cloth since none is used. Filtration is accomplished by two layers of stainless steel coiled springs placed in corduroy fashion around the drum.



High efficiency in handling waste sludge is provided by vacuum filter which utilizes coiled springs for dewatering

Vacuum filter, which was placed in operation in August 1954, removes 50 lb (dry weight) of CaSO_4 sludge per sq ft/hr from effluent. Unit has a nominal area of 250 sq ft. Sludge, which is being dewatered, is the result of the neutralization of acid wastes with lime. Material going to filter consists of a 20% slurry. Cake containing 35% solids is discarded and filtrate is returned to treatment system.



Rear view of coil-type vacuum filter in operation at Toms River — Cincinnati Chemical Corp.

Upon completion of the dewatering cycle, the two layers of coiled springs leave drum and are separated from each other by discharge rolls in such a manner that filter cake is lifted off lower layer of springs

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Tube-In-Strip

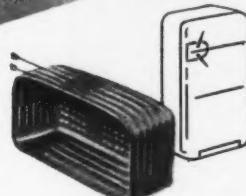
"a 'sandwich', not welded, brazed or bonded"



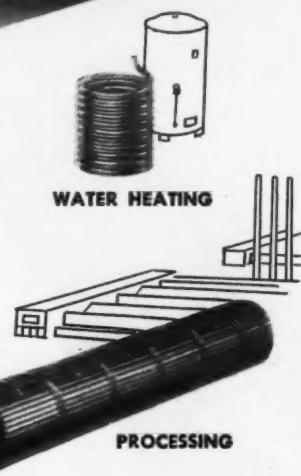
AUTOMOTIVE



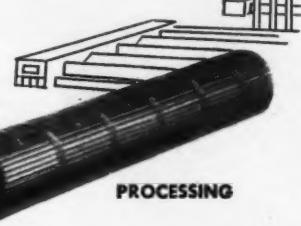
AIR CONDITIONING



REFRIGERATION



WATER HEATING



PROCESSING

Here, for the first time, is a combination of tube and strip that is made from a single piece of metal! No joints! The product of intensive development by Revere's Research and Development Department, which sought and found a brand new way to give American industry tube plus strip that is more economical to buy, more economical to work, stronger and more efficient in performing 1,000 tasks.

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the tubes can be made rectangular, fluted, half-round, hexagonal, etc.

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The applications of this radically new, different and superior Revere Product are unlimited. We most proudly present Revere Tube-In-Strip to the designers and manufacturers of American Industry. The Revere Technical Advisory Service and the Research and Development Department will gladly collaborate with you in taking full advantage of this marvelous new material.

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When inquiring check CP 3404 opposite last page

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REFRIGERATION

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Evaporators
Cooling Coils
Cold Walls

AIR CONDITIONING

Condensers
Evaporators

HEAT EXCHANGERS

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MANY, MANY OTHER APPLICATIONS IN
EVERY INDUSTRY

NEW SOLUTIONS of processing problems

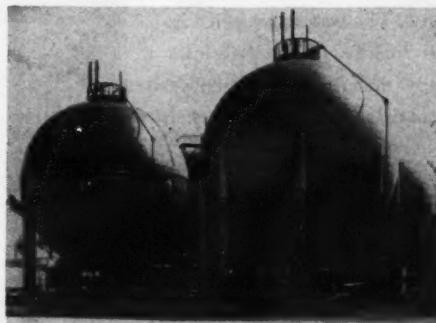
and discharged from upper layer by aid of a positioned tine bar.

Two layers are then washed separately by spray nozzles and reapplied to the drum by grooved aligning rolls. Design allows springs to flex in opposite directions while being washed, thus assuring that filter media entering vat is always clean. This eliminates blinding or clogging and assures a constant output.

Constant drum rotation at speed needed for conditions of application is provided by a variable-speed motor coupled directly to a standard double-enveloping worm gear reducer. Reducer furnishes a compact drive system. Double-enveloping worm gear design delivers smooth power, which is a requirement of the filtering action.

(Coilfilter vacuum filter is product of Komline-Sanderson Engineering Corp., Dept. CP, Peapack, N.J. . . . or for more information about manufacturer's product reader may simply check CP 3405 on form opposite last page.)

(Worm gear speed reducer is product of Cone-Drive Gears, div. of Michigan Tool Co., Dept. CP, 7171 E. McNichols Rd., Detroit 12, Mich. . . . or for more information check CP 3406 on form opposite last page.)



Battling Old Sol

Heat gains in 55-ft diam anhydrous NH_3 storage spheres are kept down to hundreds instead of customary thousands of Btu per hr by use of cellular glass block insulation. Blocks were installed by impaling them on steel rods spot-welded to walls of sphere. Located at Tuscola, Illinois, NH, plant of U.S. Industrial Chemicals Division of National Distillers Products Corporation, each of the four spheres holds

750 tons of ammonia at 55 psi and 26°F.

(Foamglas insulation is product of Pittsburgh Corning Corporation, Dept. CP, One Gateway Center, Pittsburgh 22, Pa. . . . or for more information check CP 3407 on form opposite last page.)

NEW SOLUTIONS of processing problems

**Rubber testing simplified in lab
by maintaining standard
air conditions . . .**

test results are no longer affected by changes in temperature and humidity

Problem: Laboratory testing of rubber samples was a difficult and delicate operation at Phillips Chemical Company, Borger, Texas. The compounds are extremely susceptible to variations in the surrounding air temperature and relative humidity. A few degrees difference can affect stress values, tensile strength, and ultimate elongation.

Temperature and humidity readings had to be taken regularly and correction factors had to be used to convert the test results to acceptance values at standard conditions (established as 77°F and constant relative humidity).

The laboratory compounds small batches of synthetic and natural rubber stocks and subjects them to the tests to determine quality of the carbon black produced in the plant.

Solution: To simplify the test procedures and to reduce the margin of error, the company installed a humidity conditioning system. Combining chemical-type dehumidification and a simple system of heating and cooling coils, system maintains laboratory at 77°F ($\pm 3^{\circ}\text{F}$) and 35 per cent relative humidity.

Heart of system is a Kathabar package unit, which dehumidifies 1000 cfm of outside air. Unit uses a solution of lithium chloride as the dehumidifying medium. The solution, at a set density, will absorb



Temperature readings are no longer necessary after each test in rubber laboratory

moisture from the contacting air stream to an extent inversely proportional to the solution temperature. The temperature of the solution is automatically regulated by the temperature and rate of flow of the coolant used in the coils.

Dehumidified air leaves the unit and is mixed with 1500 cfm of air recirculated from the laboratory. This mixture is cooled or heated as necessary and delivered to the laboratory. System effects a reduction from 130 grains of moisture per pound

LUNCOR PVC VALVES REPLACE HIGH-ALLOY VALVES

**Also Replace Valves Lined With Glass,
Porcelain, Stoneware, Hard Rubber
At Substantial Savings**

LUNCOR is the first all-molded PVC valve designed and engineered by a valve manufacturer. LUNCOR PVC is a strong, rigid type of unplasticized polyvinyl chloride. The valve design has been created to take full advantage of the properties of PVC. LUNCOR PVC can be molded to precise tolerances and is remarkably corrosion-resistant, odorless, tasteless, non-toxic, non-porous, non-contaminating, and weighs only one-sixth as much as metal. The new valve, with its full line of fittings, permits ready installation of complete plastic piping systems.



FIG. 2600
125 WP
140°F.



LUNCOR FITTINGS

The complete line of fittings which complements the new LUNCOR Valve includes: caps, couplings, plugs, unions, reducing bushings, flanges, elbows, and tees. LUNCOR Fittings are made of the same high-quality rigid polyvinyl chloride as the Lunkenheimer LUNCOR Valve.

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FROM YOUR LUNKENHEIMER DISTRIBUTOR OR FROM THE LUNKENHEIMER COMPANY, BOX 360, CINCINNATI 14, OHIO.

LUNKENHEIMER
THE ONE *Great* NAME IN VALVES

When inquiring check CP 3408 opposite last page

to 31 grains. Water at 70°F is all that is required. Water can be reused in other processes or can be recirculated cooling tower water. Lithium chloride solution is continuously regenerated.

Results: Testing procedures have been simplified, resulting in considerable savings in time. Temperature readings after each test and the use of the correction factors are no longer necessary.

Time lag between production, sampling, and necessary adjustment of production has also been shortened. The 6° temperature spread, and its effect on test results, is within allowable tolerances.

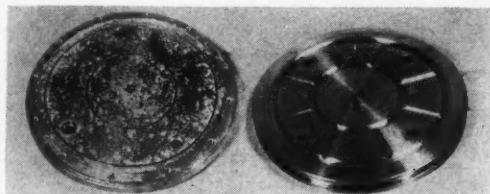
Maintenance on system is small. The Kathabar unit has only two moving parts, the solution pump and the regenerator fan motor. Solution concentration is automatically maintained and there is no loss or carryover of the solution.

(Kathabar air conditioning systems are product of Surface Combustion Corporation, Dept. CP, Toledo 1, Ohio. Check CP 3409 opposite last page.)

Pennsylvania Salt Mfg. Co. proves value of titanium for handling bleach

Problem: Filter press of 316 stainless steel used for handling commercial bleach solutions developed severe pitting corrosion in one to two weeks.

Solution: Research on the use of titanium for handling commercial bleach solutions was conducted at Pennsalt's Whitemarsh Research Laboratory near Philadelphia. A titanium filter press



Type 316 stainless steel component of filter press (left) after two weeks' exposure to calcium hypochlorite compared to titanium part (right) after seven months' exposure

was then constructed at company's Wyandotte, Michigan plant and placed in service. Titanium was used for contact parts of filter which presses solid cakes from slurries of calcium hypochlorite.

Results: After seven months' operation, titanium filter press not only is in good operating condition, but shows no evidence of corrosion whatsoever.

(Titanium used in filter press is product of Rem-Cru Titanium, Dept. CP, Midland, Pa. . . . or check CP 3410 on form opposite last page.)



**this
little drip
costs you money!**

On a 1000-per-gallon product, 6 CC of leakage per minute costs you about \$90 per year in unnecessary product waste.

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PUMP PACKING WITH**



mechanical seals

Eliminate unnecessary stuffingbox leakage by installing a BJ Mechanical Seal. You not only realize important savings of pumped products but you also save on repacking and downtime losses. A BJ Mechanical Seal also prevents contamination of the pumped liquid . . . protects against volatile and corrosive liquid hazards.



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BJ makes reliable high-precision seals in material and construction combinations to answer almost any pressure, temperature and liquid requirements. This means that BJ can provide the *one best seal* for each specific pumping need. Ask your nearest BJ sales engineer to show you how Mechanical Seals can save you money. Or you can obtain further information by writing for BJ Bulletin No. 54-1-10,000.



Byron Jackson

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When inquiring check CP 3411 opposite last page

**Find traces of sulfur compounds
to prevent poisoning
of catalyst . . .**

ammonia plants use electrical titrating instrument to spot concentrations in ppm range

Problem: Even minute amounts of sulfur compounds in the hydrogen used to make ammonia can poison ammonia catalyst. Plants like Dow Chemical at Velasco, Texas, and Phillips Chemical at Houston, have to remove the sulfur compounds. If they are not removed, catalyst efficiency drops, with a resultant loss in production. Ultimately, this means replacing catalyst charge — and the bill for this in a typical plant is \$20,000.

Solution: In these two plants, efficiency of scrubbing operations is checked by an automatic, electric instrument which actually titrates samples

to record sulfur content. By continuously titrating for sulfur compounds with electrically generated bromine, it can detect as little as a few parts per million of catalyst poison. It is so sensitive that it will detect hydrogen sulfide in a concentration of 0.04 ppm.

Dow, in Velasco, had trouble locating the source of their sulfur contamination. When usual remedies did not work, they used a titrilog to find that sulfur was coming from process water taken from a nearby

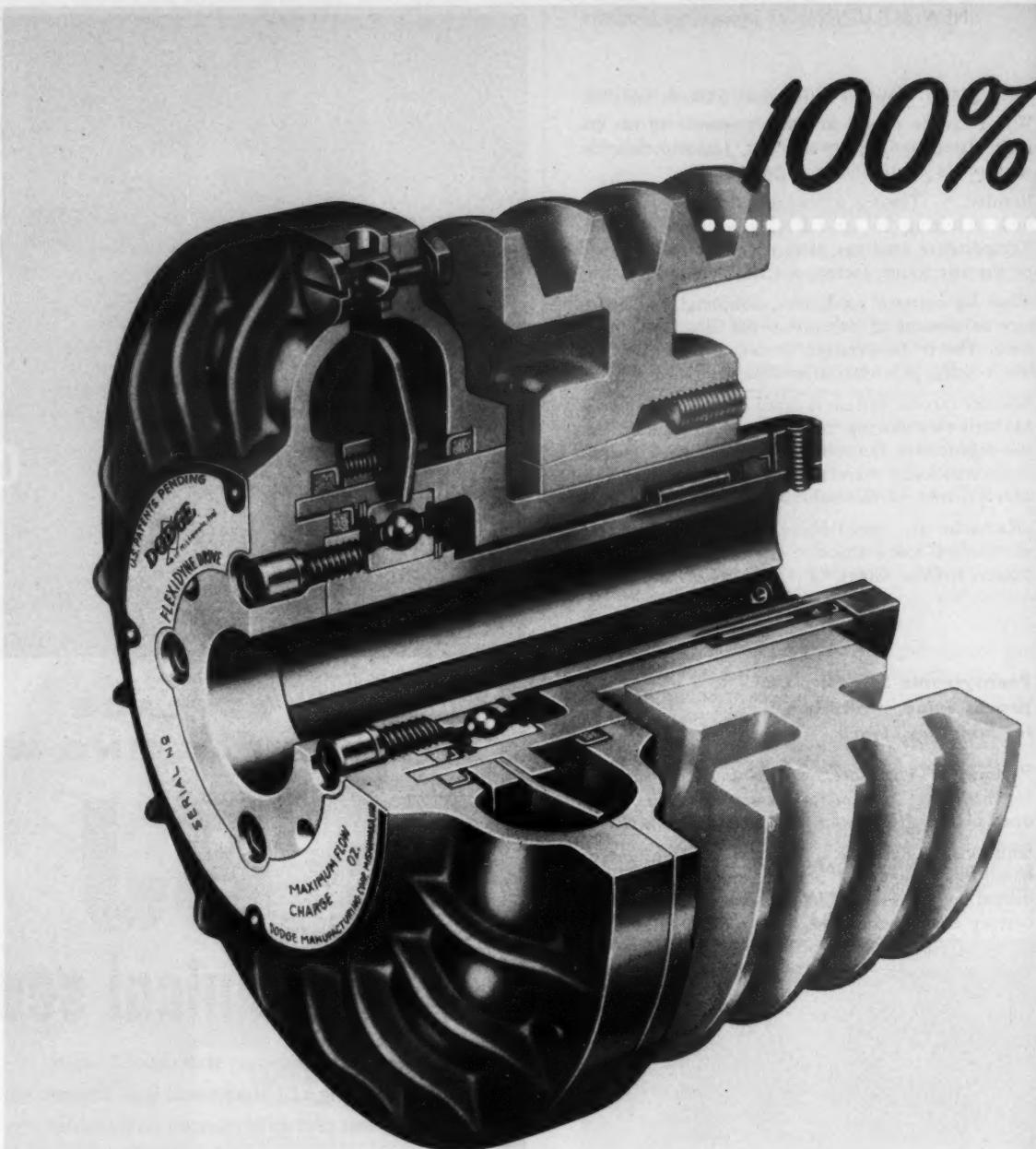
river. This river was periodically contaminated by sulfates from tidal water. Though concentrations were a few parts per million, sensitivity of the instrument permitted them to track down this intermittent source.

Phillips Petroleum is doing the more usual job of monitoring natural-gas feed stream and several process streams on an automatic repetitive cycle. Instrument gives them instant warning of any conditions which might harm their catalyst.

In operation, sample stream is continuously bubbled through a solution contained in a reaction cell. Reactive sulfur compounds are absorbed from the stream by the solution. In solution there is a continuous reaction between absorbed sulfur compounds and electrolytically generated bromine. End point of



Instrument responds to changes of sulfur content within seconds



100%

THE NEW DEVELOPMENT THAT

- STARTS LOADS SMOOTHLY
- PROTECTS AGAINST SHOCKS AND OVERLOADS
- SAVES POWER
- GIVES 100% EFFICIENCY AT FULL LOAD

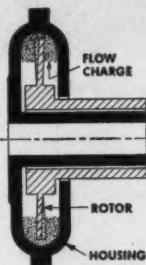
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FLEXIDYNE

THE DRY FLUID DRIVE

Field experience proves that the new principle employed in Flexidyne provides a better way to handle difficult drive problems.

The "dry fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.



After a momentary slip between housing and rotor the two become locked together and achieve full load speed without slip and at 100% efficiency during the running cycle.

Flexidyne is easy to select off the shelf. Each size has a standard horsepower rating, yet the flow charge can be varied quickly to give you tailor-made torque to suit the job.

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DODGE
of Mishawaka, Ind.

When inquiring check CP 3412 opposite last page

NEW SOLUTIONS of processing problems

this reaction is automatically maintained at a constant value by means of sensing electrodes which match the bromine generation to the reactive compound absorption. Thus bromine-generating current varies directly with amount of sulfur compounds present in the stream. This current is recorded as the variable sulfur.

Results: Since threshold of the instrument's sensitivity is below one part in 10 million, it is capable of detecting any trace of sulfur which might be harmful to catalysts. Furthermore, instrument response time of only a few seconds allows plant operators to spot changes as they happen.

(Titrilog is a product of Consolidated Engineering Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena, Calif. . . . or for more information check CP 3413 on form opposite last page.)

Deflasher cuts labor costs \$110 per day

Case history of how a large plastics molder slashed direct deflashing labor costs by \$110 per day is presented in illustrated four-page bulletin. Moldings are enclosed in a cabinet-type machine and subjected to showers of soft-grit pellets.

Bul PE-7 is issued by Wheelabrator Corp., Dept. CP, 1036 South Bykit St., Mishawaka, Ind. When inquiring specify CP 3414 on form opposite last page.

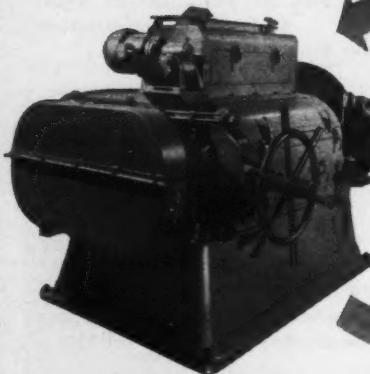


"Pippin, I'll give you exactly 3 minutes to get that pool of acid off the floor!"

ALLIS-CHALMERS

PROCESS SYSTEM

Converts Fine Particles Into Granular Product To Meet Consumer Demand



Compacting Mill



1 Recovery operation starts with unacceptable minus 30 mesh chemical salt — fines created in original process.

2 An Allis-Chalmers heavy duty compacting mill is the principal component in the recovery system. The flakes or slabs illustrated are the result of mechanical densification in the compacting mill. An Allis-Chalmers two-pair high corrugated roller mill is used to granulate flakes. Final separation is made in the *Circle* sifter — an Allis-Chalmers gyratory screen. An 80% to 90% recovery of salable product is effected.

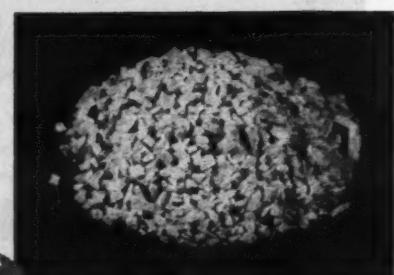
3 The resulting granules (100% minus 3 mesh and 100% on 10 mesh) equal or surpass natural product in every respect. Reconstituted product differs little from parent product in abrasion tests. Other tests have proved the compacted granule superior in controlled solubility. Granulated product is more uniform in particle size, flows more freely and has better "eye-appeal."

A-4743

Circle is an Allis-Chalmers trademark.



Roller Mill



For complete information, see your A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 25C6177J.



ALLIS-CHALMERS

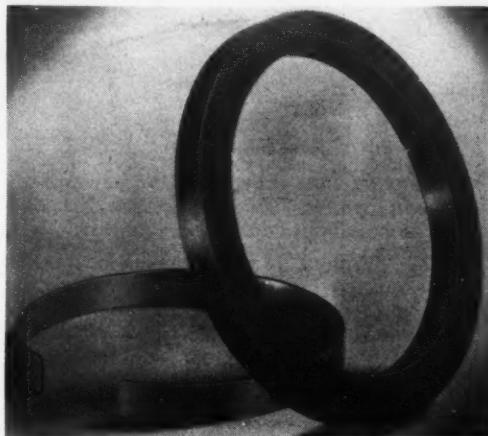
When inquiring check CP 3415 opposite last page

NEW SOLUTIONS of processing problems

Less cylinder liner wear with carbon-Bakelite piston rings . . .

compressors in large refinery also require less lubricating oil

Problem: Cast iron piston rings failed on compressors used in the manufacture of ammonia in a large refinery. Cylinder liners became worn and excessive lubricating oil was used. A number of different compressors are in use. Conditions vary from 80 to 3800 psig at temperatures up to



Ring is assembled around an elliptical-shaped, flat spring steel expander

375°F. Units are used for cascade low-temperature refrigeration system, for compression of synthesis gas, and for air.

Solution: About one year ago, carbon-Bakelite segmented piston rings were installed in the compressors. These rings are made of a canvas-base Bakelite heavily impregnated with carbon. Material is resistant to corrosion, does not deteriorate with age or use, and is more resistant than metal to abrasion.

Step joints on rings are machined with strong fillets and made so that all segments are interchangeable. Ring is assembled around an elliptical-shaped, flat spring steel expander. Expander is carefully formed to provide a full seal across the gap of each segment.

Results: Piston ring failures on compressors have been eliminated by the use of the carbon-Bakelite units. Less cylinder liner and ring groove wear has occurred. Less lubrication oil has been needed.

(Carbon-Bakelite piston rings are product of France Packing Co., Dept. CP, 9925 Bustleton Ave., Philadelphia 15, Pa. . . . or for more information check CP 3416 on form which is located opposite last page.)

NEW SOLUTIONS of processing problems

Trouble-free service given
by large speed reducers
at Abbott Labs . . .

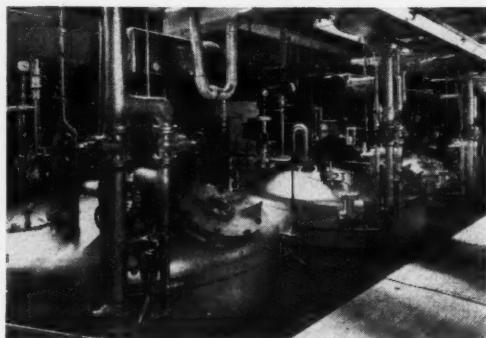
worm gear units driving turbine impellers
have speed reduction ratio of 10:1

Problem: Agitation on fermenters at Abbott Laboratories, North Chicago, Illinois had to be dependable in order to maintain schedules on production of penicillin and other valuable antibiotics. Failure of agitation during fermentation process could cause loss of time and a considerable amount of expensive reactants, and reduce yields. Units had to be in service almost continuously under widely varying load conditions.

Solution: In 1946 Abbott installed worm gear speed reducers to drive turbine impellers on twelve 5000-gal. steel production fermenters. Reducers are custom engineered with vertical low shaft extensions, a reduction ratio of 10:1, a rating of 43 hp with an input of 580 rpm.

They are designed for class two service: Eight to ten hour service where recurrent shock loading is encountered, or 24 hour service with no shock.

Worm gear design permits smooth, even transmission of power. All parts are totally enclosed



Production fermenters at Abbott Laboratories with worm gear speed reducers driving agitators

in an oil- and dust-tight housing, lubricated from a central oil bath. It has inherent high shock load resistance, low rate of wear, and requires little maintenance.

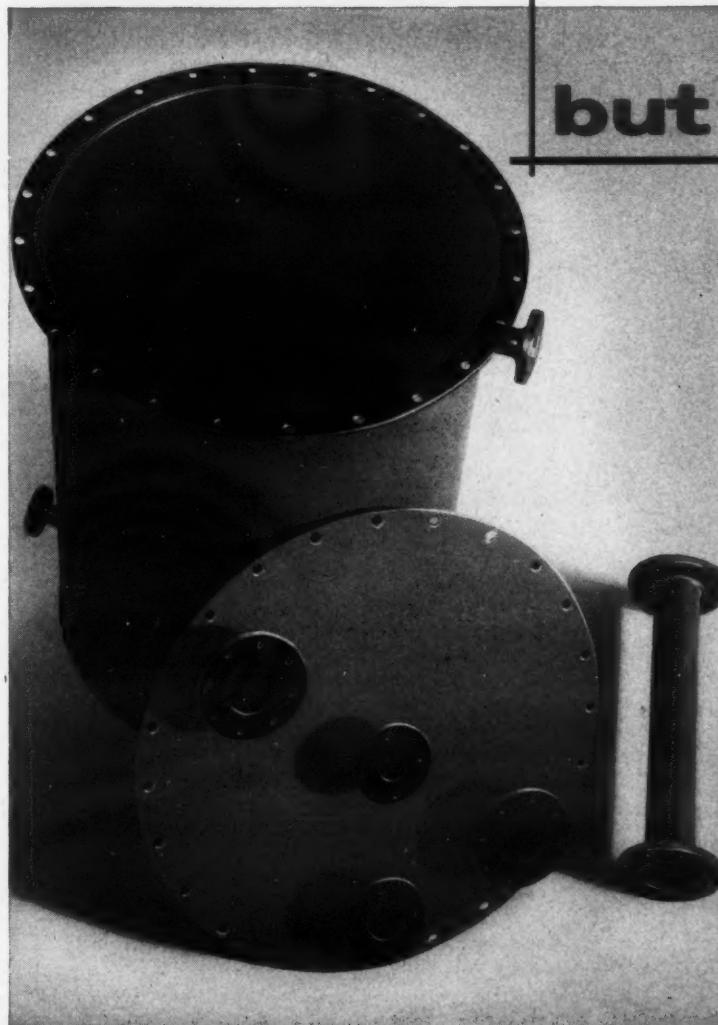
Results: Worm gear speed reducers have provided trouble-free service since installation with only normal maintenance. Lost production time due to failure of agitation has been kept to a minimum since load on drive motors is eased and turbine impellers are driven with a smooth steady torque. High yields have been maintained.

(Worm gear speed reducers were engineered and supplied for Abbott Laboratories by Cleveland Worm and Gear Co., Dept. CP, 3249-59 E. Eightieth St., Cleveland 4, Ohio . . . or for more information check CP 3417 opposite last page.)

*Made from EXON resins by Kaytor Industries, Inc., Division of Kaye-Tex Mfg. Corp., Yardville, N.J.

INDUSTRY'S MOST SHOCKING WASTE...

CORROSION COSTS EQUAL 25% OF NET PROFITS!



MURRO makes corrosives
harmless with
VYFLEX L-10!*

PORTRUSH, V.A. To make an extremely powerful industrial bleach, Murro Chemical Co. combines caustic soda and chlorine. Ordinarily, these could corrode any metal tank fast—but not at Murro. Designed by Amroc, Inc., New York, costly tanks 4' high, 3' in diameter, are lined with low cost VYFLEX L-10, made from EXON 900 series resin. Interior surfaces, inlets, outlets and flange connections will never know corrosion.

You can stop corrosion!

EXON PVC resins are engineered specifically to wipe out specific corrosion problems. They are the bases for a wide variety of lightweight structural rigid, linings, coatings, pipes and fittings. To stop Industry's most shocking waste, call:

Firestone



CHEMICAL SALES DIVISION
FIRESTONE PLASTICS CO., Dept. 68D Pottstown, Pa.
A Division of the Firestone Tire and Rubber Company

When inquiring check CP 3418 opposite last page

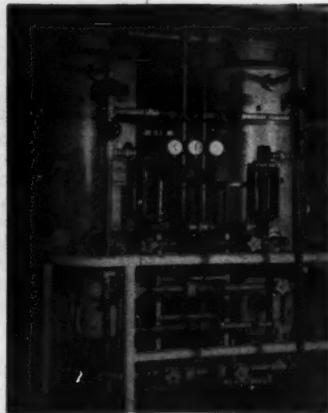
NEW SOLUTIONS

Humidifier troubles solved by demineralizers . . .

use of deionized water stops scale formation in units

Problem: Scale formation in humidifiers was a troublesome problem at Behr-Manning Division, Troy, N. Y., manufacturer of coated abrasives. Used in the final step of the manufacturing process in connection with an oven cure, the 27 units frequently became inoperative or inefficient because of the scale produced by the dissolved solids in the water supply.

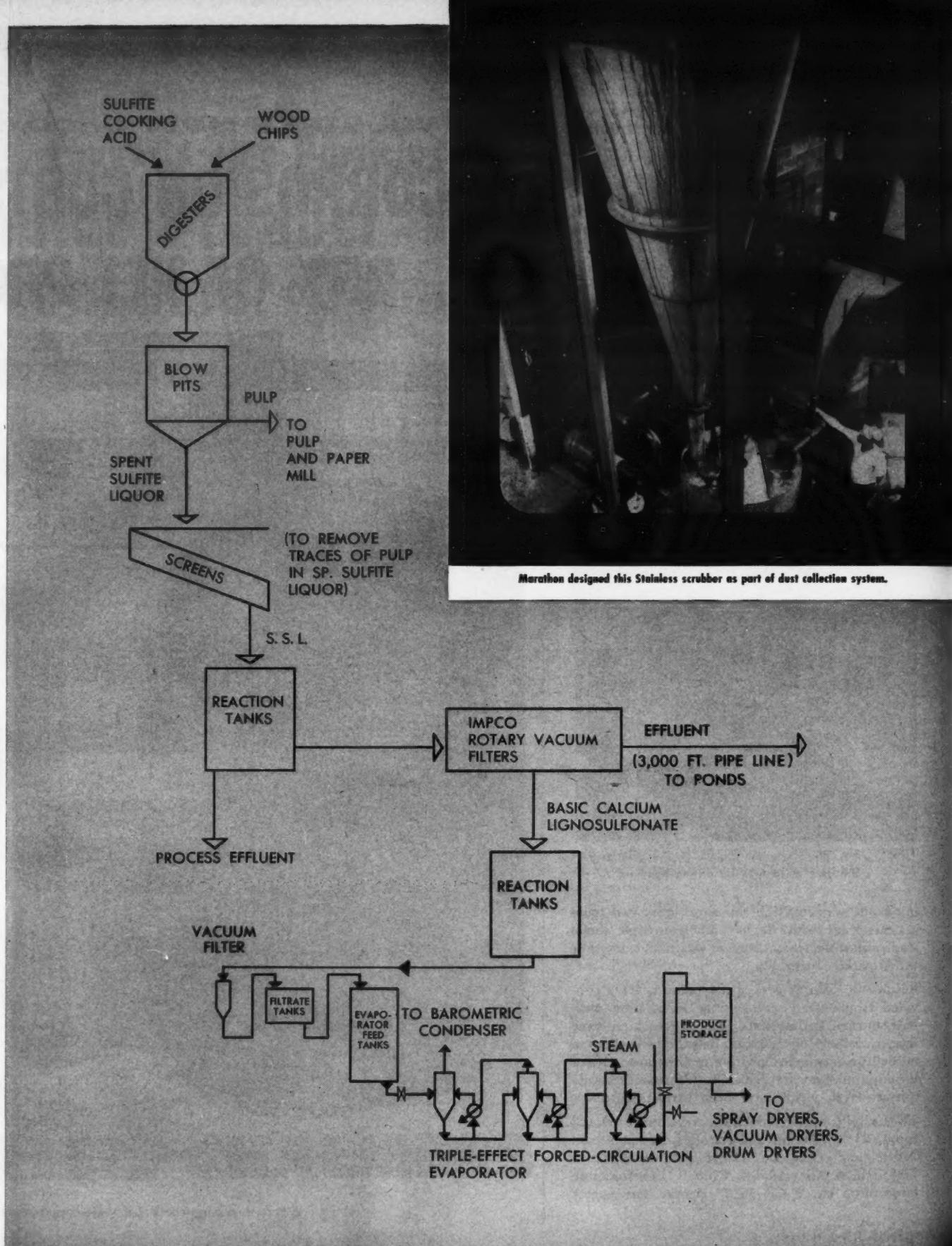
Solution: Situation was solved by a deionization system which removes all dissolved solids from the water before it reaches the humidifiers. Because of the scattered locations of the humidifiers, three pairs of monobed demineralizers were installed. Each con-



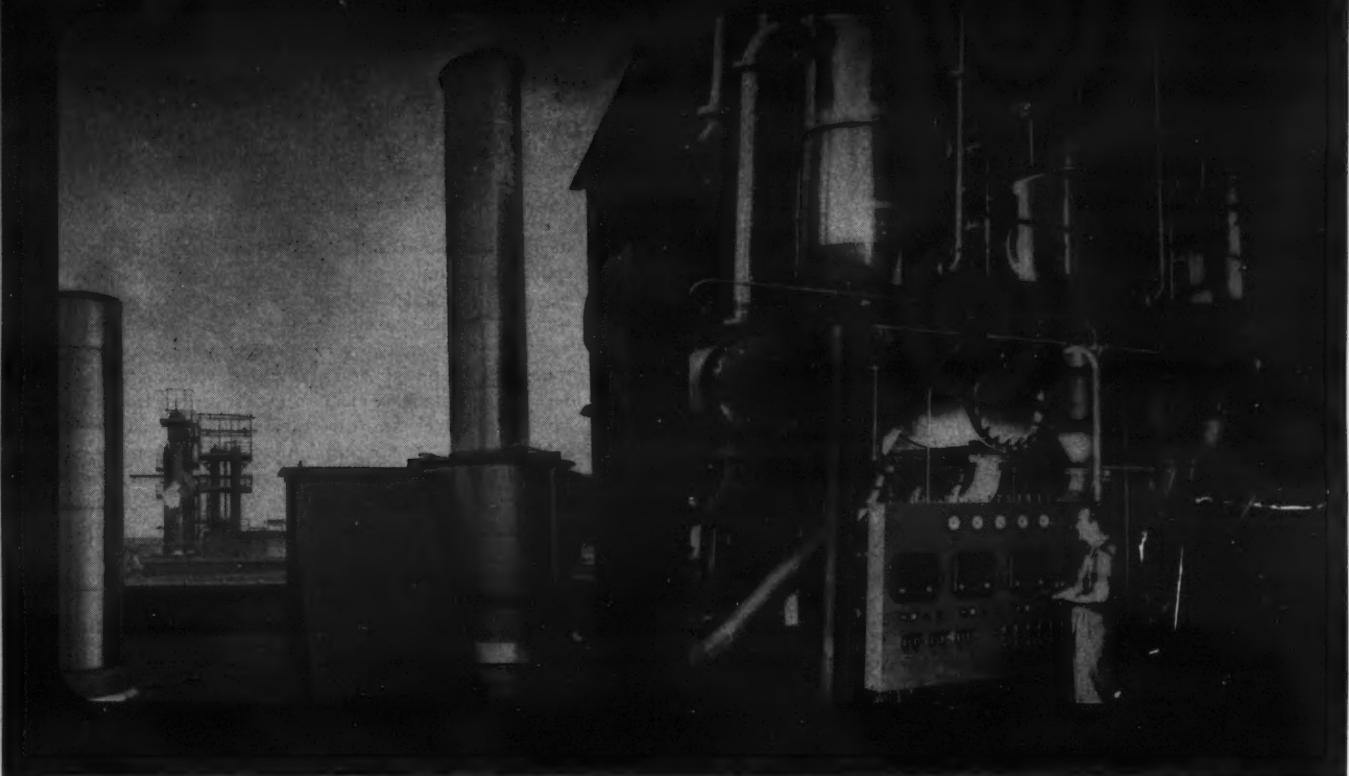
One of the three pairs of demineralizers used to supply deionized water to 27 humidifiers in coated abrasives plant

tains a mixture of Amberlite cation and anion exchange resins. Each pair is designed to operate either in tandem or individually. This assures a continuous supply of water when one of the units is shut down for regeneration.

Largest pair has rated capacity of 12,000 gal each; second pair, 7000 gal each; third pair, 3000 gal each. Rated output of units is 5 gpm per sq ft of bed. Largest unit (36" diam) delivers 34 gpm.



Marathon designed this Stainless scrubber as part of dust collection system.



Stainless Steel stacks vent corrosive liquid from dryers.

Operator checks controls on Stainless Steel evaporator.

How sulfite liquor waste is turned into profit with the help of Stainless Steel

At its sulfite mill in Rothschild, Wis., the Marathon Corporation produces more than 50,000 tons of cellulose fibers per year. In the 1920's, Marathon started an intensive research program aimed at reducing river pollution from the spent sulfite liquor and recovering the 50% wastage of organic solids that resulted.

By fractionating the sulfite liquor, valuable lignosulfonates could be produced; but it was strictly a laboratory operation because the highly acid liquor corroded all normal materials—until Stainless Steel became available in the early 1930's.

Since it was completed in 1936, the new plant processes all the effluent from the Rothschild plant; and it

has a capacity of 75 million pounds a year. It is the only plant in the world completely devoted to the production of fractionated lignosulfonates and *approximately 50% of the equipment is made from Stainless Steel*. This includes thousands of feet of 6-inch tubing, storage tanks, rotary vacuum filters, evaporators and dryers. Much of the Stainless is type 304 or 316. And much of it has been in continuous service for 15 years, compared to previous materials that disintegrated after 18 months.

When designing new process equipment, frequently nothing will save more money than the careful use of long-life Stainless Steel. For service-tested quality, specify USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL
SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS



For more information on product at left, specify CP 3422 . . . see information request blank opposite last page.

Results: Use of deionized water has completely solved scaling problem. Humidifiers now operate efficiently with minimum maintenance.

(Monobed deionization units were designed and installed by Hungerford & Terry Inc., Dept. CP, Clayton, N. J. Check CP 3419 on form opposite last page.)

(Amberlite ion exchange resins used in demineralizers are product of Rohm & Haas Co., Dept. CP, Washington Sq., Philadelphia, Pa. Check CP 3420 opp. last page.)

Large paper mill in South lowers costs through use of alum liquor . . .

liquid requires less handling than dry material

Problem: Dry alum (aluminum sulfate) used at a large paper mill in the South required excessive handling and expensive dry-feeding machines.

Solution: During World War II, company started using liquid alum at this mill. Other mills of the company have also converted to liquid alum either before or since that time. Special grades of alum are still used in the dry form for some operations requiring relatively small quantities.

Results: Mill has found that liquid alum requires much less handling, resulting in a considerable labor saving. Expensive dry-feeding machines are no longer needed. Fact that the flocculating solution is already in solution and ready for immediate use adds to its convenience.

(Liquid alum is product of Consolidated Chemical Industries Inc., Dept. CP, 640 Mellie Esperson Bldg., Houston 2, Tex. . . or for more information check CP 3421 on form opposite last page.)



Southwestern Engineering Company of Los Angeles manufactures stainless steel separators for foods and chemicals. Southwestern relies on Marman stainless steel V-band couplings to hold and seal from one to four screens on each vibrating separator. And,

for rapid screen change, Marman's "quick coupler" latch provides easy assembly and disassembly.

Marman's complete line of clamps, straps and couplings can meet your clamping and holding needs, too. Write for full information.

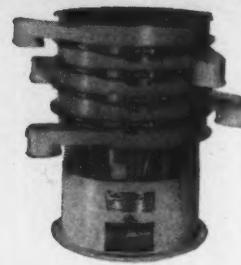


11214 EXPOSITION BLVD., LOS ANGELES, CALIFORNIA

IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 15, ONTARIO

MARMAN PRODUCTS ARE MANUFACTURED UNDER VARIOUS U.S., CANADIAN AND FOREIGN PATENTS AND OTHER PATENTS PENDING

When inquiring check CP 3423 opposite last page



Marman V-Band Couplings Speed Screen Change on Sweco Separators

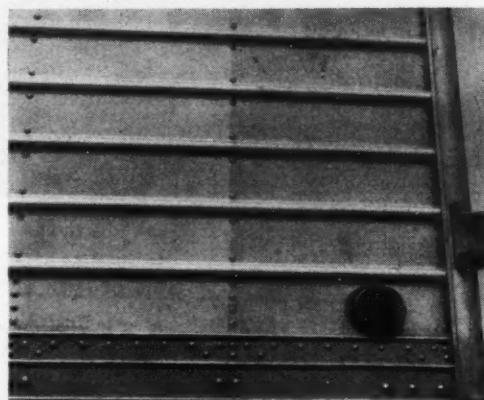
NEW SOLUTIONS of processing problems

Protects aluminum in outdoor use from pitting and dulling . . .

coating is applied by usual spray methods, needs no special finishing techniques

Service over-the-road for 16 months and 128,000 miles on a trailer-truck of Mason & Dixon Lines gives visual evidence of protection provided aluminum by lacquer coating. Accompanying side-by-side view of coated and uncoated panels on cross country trailer shows pitting and dulling of aluminum surface on uncoated section from abrasive action of sand and gravel, corrosive action of road salt and salt spray, and deteriorating influence of extremes of weather. As shown, lacquer-coated section is still in excellent condition.

Coating is a lacquer formulation of half-second



View of coated (left) and uncoated (right) aluminum panels on trailer truck body after 128,000 miles of service

butyrate. It is water-white, and is easily and quickly applied by usual spray methods with standard shop spray equipment. No baking or other finishing techniques are required and coating dries at room temperature in 10 to 15 minutes to give a smooth finish. Additional advantages were obtained through use of butyrate lacquer. One third less time was needed in periodic wash down of trailers, with less force on the brush. Terminal time, the equivalent of down time on a production line, was reduced and trailers were out on the road faster.

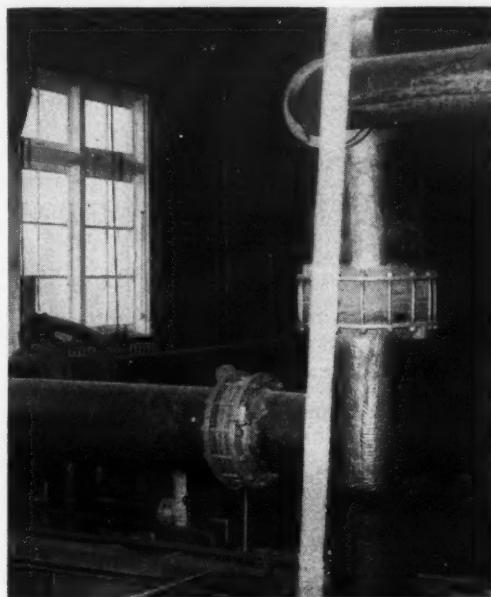
(Protective lacquer coating was supplied by Egyptian Lacquer Manufacturing Co., Dept. CP, South Kearny, N.J. . . . or for more information about manufacturer's product reader may simply check CP 3424 on form opposite last page.)

(Half-second butyrate for lacquer formulation was supplied by Eastman Chemical Products, Inc., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information about manufacturer's product reader may simply check CP 3425 on form which is located opposite last page.)

**Furfuryl alcohol resin plastic pipe
successfully handles corrosive
and abrasive slurry . . .**

reinforced piping replaces three other types that failed in service

Problem: At the Covington, Virginia, mill of West Virginia Pulp and Paper Company, three different types of corrosion-resistant piping failed due to the corrosive and abrasive action of the 1% sulfuric acid carbon slurry handled at temperature of 100-120°F.



Typical installation of furfuryl alcohol resin plastic pipe in another plant

Solution: About three years ago, an 8" Permanite plastic test elbow was placed in service. Straight pipe made of the same material was installed about six months ago. The plastic is a furfuryl alcohol resin reinforced with glass fiber. It is lightweight, strong, and has a hard, non-absorbent surface. It resists all alkalis, most acids including HCl and HF, oils, and organic solvent vapors.

Results: Test 8" elbow fabricated of the furfuryl alcohol resin plastic has now given twice the service life of previous corrosion-resistant elbow used in same location. To date no maintenance has been necessary on the plastic pipe. However, test period for the straight pipe has not yet been long enough to provide a definite measure of its serviceability in the application.

(Permanite plastic pipe is a product of Maurice A. Knight, 708 Kelly Ave., Akron 9, Ohio . . . or for more information check CP 3426 on form opposite last page.)

UNBLEMISHED BEAUTY SAFELY AT HER FINGERTIPS

Dow



o-PHENYLPHENOL, PURIFIED

(A SPECIALIZED DOWCIDE® PRESERVATIVE)

used to protect cosmetic creams, lotions
and other topical contact preparations
against product breakdown

A trace of objectionable odor to skin lotion, an unpleasant alteration in a hand cream's color or texture . . . the discriminating taste of America's cosmetics-conscious woman won't tolerate this!

Dow's o-Phenylphenol, Purified, more than meets the cosmetic industry's stringent demands. This carefully prepared Dowcide preservative is used to protect against

product deterioration through bacterial attack, while meeting all the necessary requirements for safety*.

No wonder formulators, processors and other manufacturers find a quality control answer in one or several of the fourteen versatile Dowcide preservatives. Versatile? A great many industrial and household products are safeguarded with Dowcide preservatives. Typical industries putting these superior preservatives to good effect include the paper and pulp, paint, textile, adhesives, petroleum, wax, leather, farming, transportation and other businesses. Wouldn't you, or your retail outlets, appreciate an even greater degree of product protection? The Dow laboratories are equipped to analyze individual preservative problems. For detailed information, please return coupon to THE DOW CHEMICAL COMPANY, Midland, Michigan.

**The Journal of Pharmacology and Experimental Therapeutics*—Vol. 105, No. 2, February, 1952

THE DOW CHEMICAL COMPANY • Dept. DP 960D, Midland, Michigan

Please send me further information on the uses of Dowcide preservatives. My business is _____

NAME _____ FIRM _____

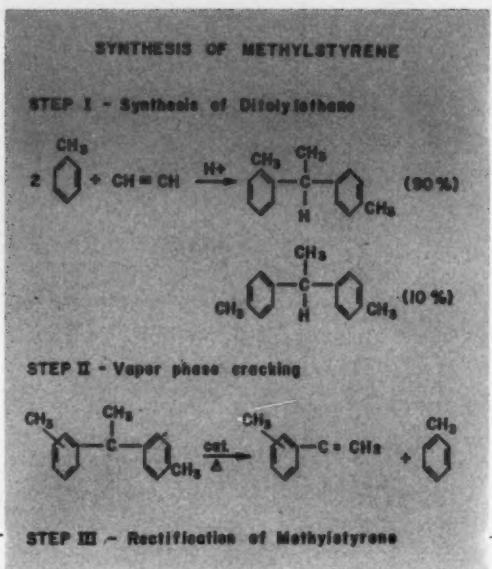
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**you can depend on
DOW CHEMICALS**

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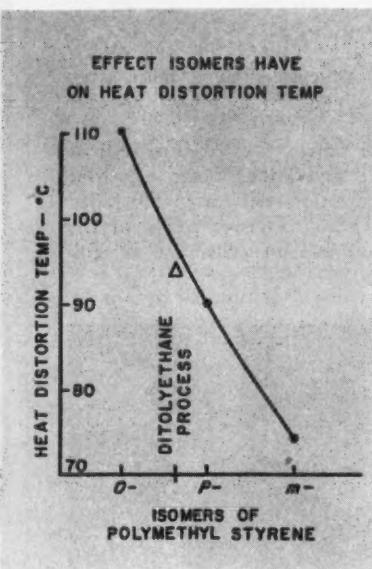
When inquiring check 3427 opposite last page



here's how methylstyrene is made

First of the three steps of the diarylethane process is the condensation of two mols of toluene with one of acetylene to form a mixture of unsymmetrical ditolylethylenes. These are vaporized and cracked, yielding one mol of methylstyrene and one mol of toluene for each mol cracked. The methylstyrene is 65% para, 33% ortho, and 2% the meta isomers. Ethyl toluene and other trace impurities are removed by fractional distillation. Final product is at least 99.7% pure methylstyrene.

The ortho isomer polymerizes the slowest, but in turn yields a polymer having the highest softening point as shown in the graph. The distortion temperature of the mixed isomers, as made by this process, is also shown.



Polymethylstyrene and methylstyrene-acrylonitrile copolymer make —

thermoplastics with heat resistance

Products show no heat distortion after repeated immersion in boiling water

Uses: Methylstyrene monomer is made into two thermoplastic injection molding compounds: polymethylstyrene and a copolymer with acrylonitrile. These can be used to upgrade moldings in existing applications, and in addition, open new fields in consumer and industrial products. Uses in film and sheeting and as monofilaments are being investigated.

Monomer has been successfully evaluated in latex and styrenated alkyd surface coatings. It also shows promise in paper, textile, and polyester resin applications.

Features: Polymethylstyrene compounds have unusual heat resistance. No distortion is shown after repeated exposures in water at 212°F. The acrylonitrile copolymer is also heat resistant and in addition has toughness. It withstands action of chemicals, has good abrasion resistance, and resists crazing. Copolymers of methylstyrene with oil-modified alkyds have a wider range of compatibility and solubility than styrene-alkyd copolymers.

Description: Methylstyrene is made by catalytic reaction of toluene and acetylene, as shown, and is available in three types currently on a developmental

properties of molding compounds made from methylstyrene

Physical	ASTM Test Method	Polymethylstyrene	Methylstyrene-acrylonitrile Copolymer
Peak flow		295	298
Bulk factor	D1182-51T	1.63	1.82
Sp gr	D792-50	1.03	1.06
Water absorption (% in 24 hr)	D570-42	0.05	0.31
Percent shrinkage (min. @ 212°F)			
30	(Cyanamid)	0.00	0.00
Mold shrinkage (in/in)	D955-51	0.0046	0.0035
Heat distortion point (°F)	D648-45T	203	207
Distortion (inches after 15 min in 212°F water, 264 psi load, 1" limit)	(Cyanamid)	0.06	0.06
Impact strength (Izod, ft-lb/in notch, 1/4" bar)	D256-47T	0.31	0.35
Ultimate tensile strength (psi)	D638-52T	6600	9700
Elongation (%)	D638-52T	2.2	2.5
Flexural strength (psi)	D790*	12,900	16,100
Modulus of elasticity in flexure (psi)	D790*	4.0×10^3	4.6×10^3
Index of refraction	D542-50	1.581	1.559
Electrical			
Dielectric strength (short time, vpm, 1/16" disc)	D149-44	890 ± 70	610 ± 40
Dielectric constant (10 ³ cps)	D150-54T	2.52 ± 0.02	2.92 ± 0.01
Dissipation factor (10 ³ cps)	D150-54T	0.002-0.004	0.0056-0.0058
Volume resistivity (ohms/cm)	D257-54T	2.63×10^{14}	2.65×10^{14}

*1 in/min crosshead speed

scale. These types are the monomer, the polymer, and as an acrylonitrile copolymer. These last two have the physical properties shown in the table.

After testing unannealed combs made both of methylstyrene and styrene, it was found that polymethylstyrene could be used at temperatures up to 32°F higher than polystyrene. Ultimate shrinkage on exposure to 212°F dry heat was 0.79% after 40 days for polymethylstyrene combs and 1.38% after 30 days for methylstyrene-acrylonitrile copolymer tumblers.

Methylstyrene monomer with 10 ppm inhibitor can be stored under nitrogen for at least 30 days at temperatures as high as 95°F without polymer formation. Characteristics of bulk polymerization at 212°F (both with and without catalyst) are comparable to styrene. Molding the polymer and copolymer is as easy as molding styrene. Minor alterations in conditions — such as a 50-75°F higher mold and cylinder temperature — are all that are necessary.

(Methylstyrene polymers are products of Plastics and Resins Div., American Cyanamid Co., Dept. CP, Rockefeller Plaza, New York 20, N.Y. . . . or for more information check CP 3428 on form opposite last page.)

**Makes blister-free,
stain-free exterior
house paints . . .**

Vehicle imparts good color, gloss properties

Uses: As a vehicle for outside house paints.

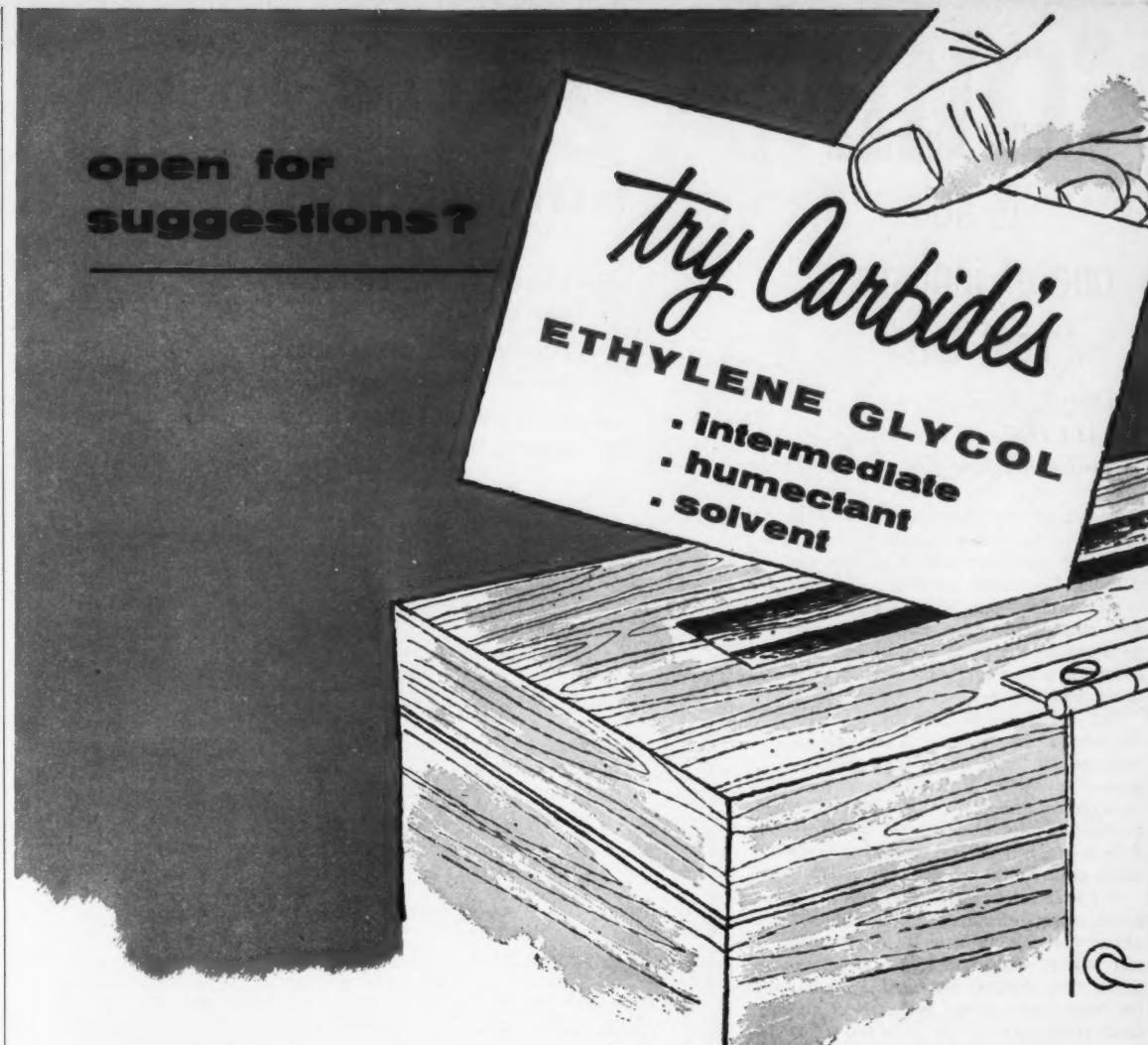
Features: When pigmented with titanium dioxide and magnesium silicate, vehicle makes superior blister-resistant and stain-free house paint. Resulting films have good color and gloss qualities, and no objectionable odor. Vehicle dries faster and harder than linseed oil and has good adhesion to wood and metal. Paints have excellent shelf life.

Description: Vehicle is a dicyclopentadiene-modified linseed oil, polymerized and reduced to 70% solids with mineral spirits. Chemical constants are:

Acid value	1.4
Iodine value	108-122
Sp gr (15.5°/15.5°C)	.921-.926
Gardner color (max)	11
Viscosity (G-H 25°C)	5.9
Pounds per gallon	7.69

(Cykelin 70 is a product of Spencer Kellogg and Sons, Inc., Dept. CP, 98 Delaware Ave., Buffalo 5, New York . . . or for more information concerning this manufacturer's product reader may simply check CP 3429 on the convenient Reader Service slip which is located opposite last page.)

**open for
suggestions?**



Intermediate

Alkyd Resins for Surface Coatings . . . Ethylene glycol is used in combination with pentaerythritol to produce alkyd resins used in making paints, enamels, and other alkyd based surface coatings.

Polyester Resins . . . Low pressure laminates used on glass fibers, asbestos, cloth, and paper, make use of polyester resins based on maleic anhydride, ethylene glycol, and vinyl type monomers.

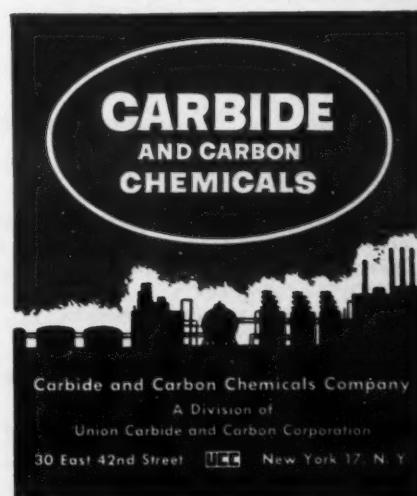
Humectant

Ethylene glycol adds strength, softness, and pliability to cellophane, paper, glue, leather, and textile fibers.

Solvent

Ethylene glycol is used as a solvent for certain stains, inks, and dyes. It is also a solvent and conducting medium in dry type capacitors.

For more information ask for Technical Information Sheet F-8327 on Ethylene Glycol. Call or write any of 23 sales offices in principal cities. In Canada: Carbide Chemicals Sales Company, Division of Union Carbide Canada Limited, Toronto.



When inquiring check CP 3430 opposite last page

ALCOA Alumina is still one of industry's "best buys"

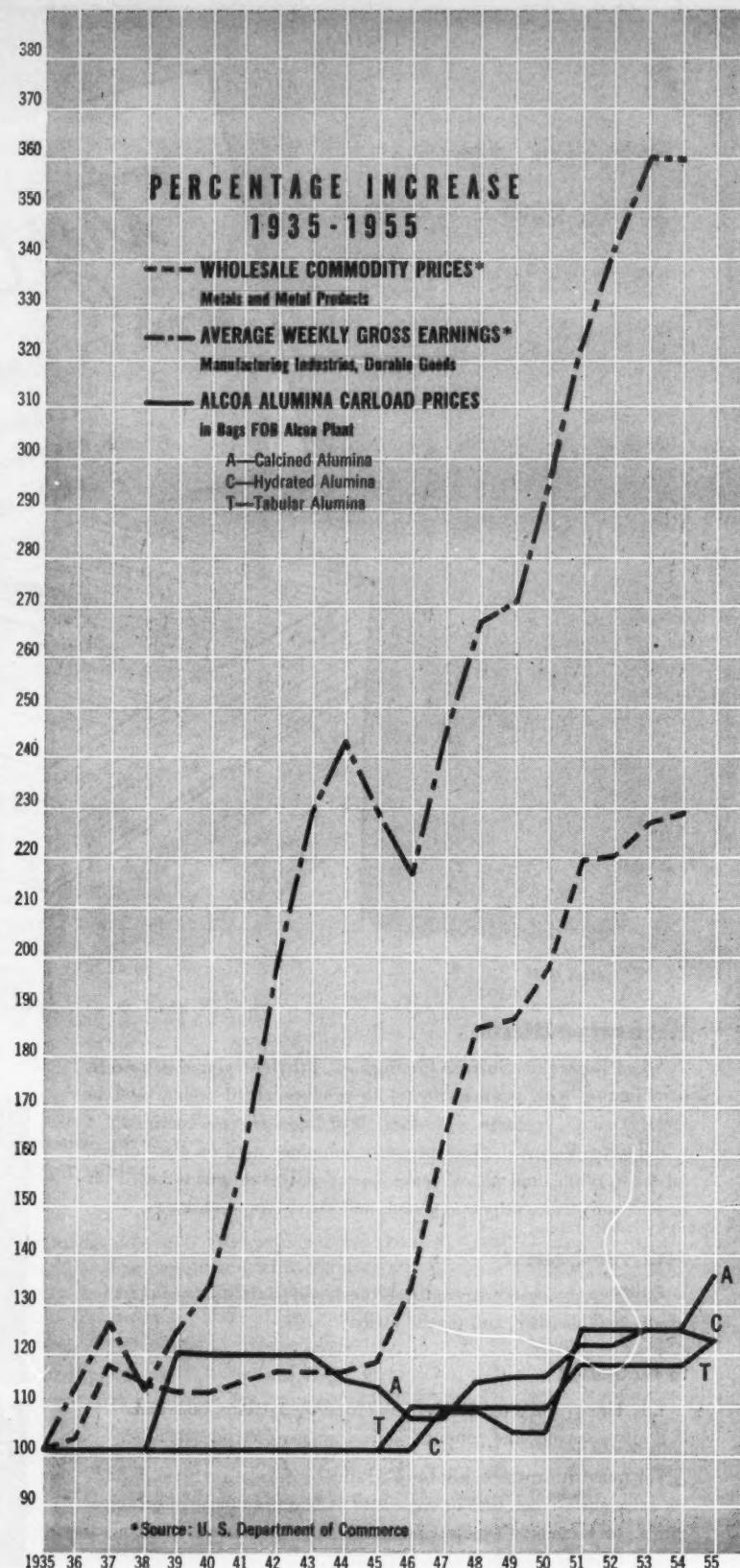
Despite sharply rising costs,
ALCOA's prices remain
uniformly low since 1915

Here is a pricing record almost without parallel in the heavy chemical industry . . . and you have helped to make it possible. Constantly increasing tonnages — your orders — plus improved efficiency and equipment, have enabled ALCOA to maintain the price of chemical aluminas at a low and uniform level for more than 20 years.

But many modern industries have discovered that ALCOA Aluminas are very special "best buys," regardless of price. They've found that wherever these versatile aluminum oxides are used, product quality is enhanced, performance is stepped up, processing is more easily controlled.

For example, ALCOA Aluminas make spark-plug porcelains more durable . . . abrasive wheels cut faster . . . refractories last longer, withstand higher temperatures. And ALCOA Activated Aluminas do remarkable things as catalysts and catalyst supports . . . dry gases and solids more efficiently than any other commercial desiccants . . . do an outstanding job in maintaining oils. Plastics, rubber, glass, textiles, china, enamel, cosmetics — a seemingly endless list of products — are better when they contain ALCOA Aluminas.

As in the past, ALCOA will maintain its prices at the lowest possible level. So, if ALCOA Alumina is not already one of your best buys, contact us right away. We would like to prove just how good a buy can be. Write to ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 705-B Alcoa Building, Pittsburgh 19, Pennsylvania.



When inquiring check CP 3431 opposite last page

MATERIALS

Coagulates waters for industrial, cooling use . . .

overcomes many problems when there's iron and alumina floc carryover

Uses: In coagulating turbid river and surface waters for industrial and cooling use. It is also recommended for waste water treatment as well as for paper mill treatment of water for general service and for settling in sewage.

Features: Excellent coagulation is effected in many cases where presently available treatments are ineffective and where iron and alumina floc carryover is a problem.

Description: Coagulant and coagulant-aid is low in cost, requires only small dosages. It is a clear, liquid, alkaline polyelectrolyte which is not corrosive to steel.

(Nalco 600 is a product of National Aluminate Corp., Dept. CP, 6216 W. 66th Pl., Chicago 38, Ill. Check CP 3432 opposite last page.)

Improves processing properties and coating characteristics for machine coated papers . . .

ups gloss, brightness, effective plasticizing, and water repellency

Uses: To improve processing properties and characteristics of coating formulations for machine coated papers.

Features: Dispersion improves gloss and brightness, effective plasticizing, and water repellency. It provides lubrication, roll-release, and controlled low viscosity during production.

Description: An aqueous calcium stearate dispersion, product is especially desirable in high speed coating operations, particularly those in which high solids formulations are applied.

(Witco Paste #253 is a product of Witco Chemical Co., Dept. CP, 122 E. 42nd St., New York 17, N.Y. Check CP 3433 opposite last page.)

Reactions of adipic acid

Six basic reactions of the carboxyl group and eleven basic reactions of the alpha methylene group of adipic acid are covered in eight-page technical booklet, along with suggested uses.

Bul I-12 is issued by National Aniline Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. Specify CP 3434 on form opposite last page.

Antifoaming, emulsifying agents should also find a wide use as chemical intermediates . . .

mainly lauric acid, they undergo reactions typical of primary alcohols

Uses: They should be investigated as antifoaming and emulsifying agents. As chemical intermediates, they are of interest in polymerization regulators for synthetic rubber; detergents, VI-improvers, and pour point depressants for lube oils; additives for cosmetic creams; textile finishing and softening agents; quaternary ammonium compounds; and in emulsifiers and detergents.

Features: Compounds undergo reactions typical of primary alcohols, such as ethoxylation, sulfation, sulfonation, esterification, halogenation, dehydration, and oxidation.

Description: Both grades of lauryl alcohol are water-white liquids at room temperature. Their tentative properties are:

Approximate alcohol composition (%)	Dytol J-68	95% Lauryl Alcohol
Decyl C ₁₀	1.0	5.0
Lauryl C ₁₂	80.0	95.0
Myristyl C ₁₄	19.0	None
Hydroxyl number	282-297	*
Ester value (max)	2.0	*
Acid number (max)	0.4	*
Iodine number (max)	0.4	*
Water (wt %)	0.1	*
Mp (°C)	20-24	*

*Specifications have not been set

J-68 is commercially available; 95% lauryl alcohol, in pilot plant quantities. Skin irritation tests have not been run, but neither is expected to produce primary skin irritation, nor sensitivity reactions. Drying tubes are recommended for tankcars and storage tanks, if long periods of storage are anticipated.

(Lauryl alcohols are products of Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . or for more information check CP 3435 on form opposite last page.)

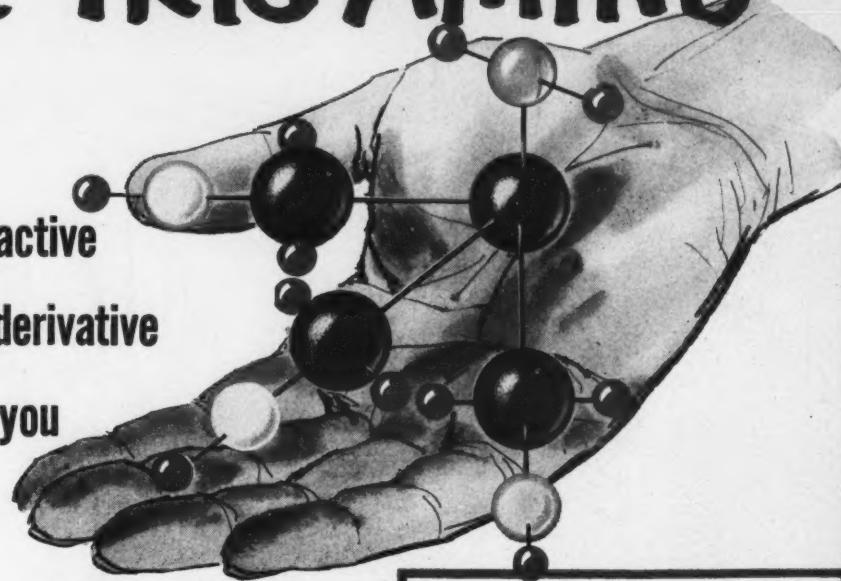
On highly absorbent products made from Fullers earth

Number of products made from Fullers earth which are highly absorbent are described in four-page publication. Description and properties of each material are covered. Photographs and tabular material help to point out the advantages of each product.

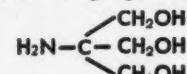
Bul 1002 is issued by Minerals & Chemicals Corp. of America, Dept. CP, Essex Turnpike, Menlo Park, N.J. When inquiring specify CP 3436 on the convenient form which is located opposite last page.

meet "TRIS AMINO"

**See what
this highly reactive
nitroparaffin derivative
might do for you**



"Tris Amino" is short for Tris(hydroxymethyl)aminomethane. This chemical is unique. It is the only tri-hydroxy molecule commercially available having a primary amine group.



Tris Amino is a raw material undergoing a very wide variety of chemical reactions. The reactivity of Tris Amino makes it of unusual interest in chemical synthesis, since it contains a primary amine group and three primary reactive hydroxyl groups. Manufacturers of resins, synthetic drying oils, and surface active agents cannot afford to overlook the potential usefulness of Tris Amino as a raw material.

Tris Amino reacts with higher fatty acids to form soaps with unusually strong emulsifying power. Relative high boiling point and low combining weight recommend the use of Tris Amino in preparation of cosmetic creams, textile specialties, cleaning compounds and many other emulsions.

CSC's new Nitroparaffin plant at Sterlington La. is now in full production. Additional facilities for increased volume of NP derivatives are nearing completion.

PROPERTIES

Molecular Weight	121.14
Boiling Point, °C	219 to 220 ^{10mm}
Melting Point, °C	171-172
pH of 0.1M Aqueous Solution at 20°C	10.4
Solubility in Water at 20°C, g/100 ml	80

Other Aminohydroxy Compounds

- AB (2-Amino-1-butanol)
- AMP (2-Amino-2-methyl-1-propanol)
- AMPD (2-Amino-2-methyl-1,3-propanediol)
- AEPD (2-Amino-2-ethyl-1,3-propanediol)

Now available in semi-commercial quantities.



CSC

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COMMERCIAL SOLVENTS

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Can Do For You

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Coupon Now

- Market Development Dept.
- Commercial Solvents Corp.
- 260 Madison Avenue
- New York 16, N. Y.
-
-

So I can further evaluate CSC Tris Amino, please send me detailed technical data and a sample.

Name _____

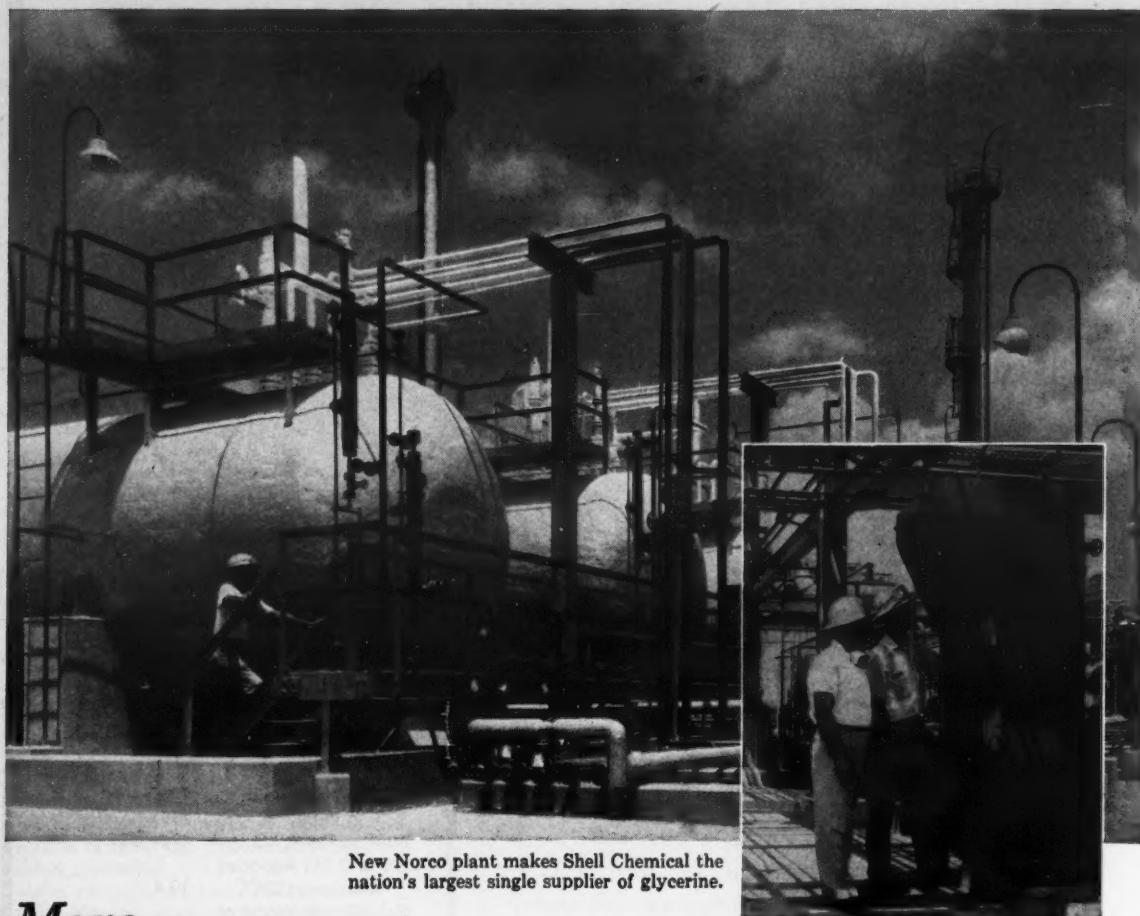
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Company _____

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City _____ Zone _____ State _____

When inquiring check CP 3437 opposite last page



New Norco plant makes Shell Chemical the nation's largest single supplier of glycerine.

More

Glycerine on stream!

Seven years ago, Shell Chemical startled industry with this news . . . high-purity synthetic glycerine, produced from petroleum, in commercial quantities!

Now . . . more good news for glycerine buyers! A new plant (Norco, Louisiana) is now on stream, adding further to the supply of uniform, high-purity glycerine.

And looking toward the future, Shell Chemical is building a plant for an entirely new synthetic glycerine process, using hydrogen peroxide and acrolein as raw materials.

Whether your glycerine requirements are small or large . . . a drum or a tank car . . . Shell's key storage facilities assure prompt delivery. Write for delivery information and specifications.

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CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE

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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver



When inquiring check CP 3438 opposite last page

MATERIALS

Offers silicone rubber masterbatch and silicone polymer that do not require toxic additives . . .

fabricated parts have low-compression set

Silastic 432 Base, a silicone rubber masterbatch, reduces compounding time and assures reproducible results. Inherent low shrink and low compression set characteristics eliminate need for toxic additives and can be obtained with relatively short cure. With proper fillers, finished silicone rubbers have excellent physical and dielectric properties. Products find use in MRG, gaskets and seals, extrusions, and wire coating. Typical properties of the colorless, translucent masterbatch are:

Plasticity (Williams, mils)	80
Sp gr (@ 25°C)	1.1
Brittle point (°F, when compounded, ASTM D746-54T)	-100

Silastic 430 Gum, a silicone polymer, has inherent low set and low shrink characteristics. This low shrink often makes possible the use of molds designed for conventional organic rubber parts.

Because low compression set is obtainable without use of additives (and short cure), parts made from this gum can be used in contact with foods, drugs, or cosmetics. With suitable fillers, gum produces products which retain good dielectric properties in elevated temperature service, in high humidity, or severe weathering conditions. Typical properties of the colorless, translucent gum:

Plasticity (Williams, mils)	47
Sp gr (@ 25°C)	0.98
Brittle point (°F, when compounded, ASTM D746-54T)	-100

(Silicone base and gum are products of Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. . . . or for more information check CP 3439 on form opposite last page.)



MATERIALS

**Prevents pinholes, pits,
and fish-eyes in paper
coating applications . . .**

Foamless casein gives higher gloss, better leveling.

Uses: Casein is used in high quality paper coating applications.

Features: In addition to being almost entirely free of both internal and surface foam, casein produces a higher gloss and shows better leveling characteristics and better varnishability than standard high quality casein paper coatings. Material is especially designed to prevent pits, pinholes, and fish-eyes in paper coating applications.

Description: Foamless casein costs about the same as ordinary imported casein, but results show generally lower production costs for paper manufacturers.

(Casein FF-30 is a product of Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. . . or for more information check CP 3440 on form opposite last page.)

Color pastes for vinyls

"D" Series color pastes for vinyls reproduce exact color from batch to batch. Seven-page bulletin compares color, opacity, heat and light stability, alkali resistance, percent pigment, relative strength, weight per gallon, and chemical type of the 55 pastes. Tests and definitions are given.

Bul #175 is issued by Claremont Pigment Dispersion Corp., Dept. CP, 110 Wallabout St., Brooklyn 11, N.Y. When inquiring check CP 3441 on the convenient Reader Service slip which is located opposite last page.

For more information on product at right, specify CP 3442 . . . see information request blank opposite last page.

FAMOUS LIGHTHOUSES OF AMERICA



Portland Head Lighthouse, Maine, was built between 1787 and 1790 by two Portland masons engaged by George Washington, who instructed them to use rubblestone taken from fields and shores. During the Civil War, when raids on shipping required sighting the light from greater distances, the tower was raised 8 feet. Today it stands 80 feet above land and 101 feet above water at the southern entrance to Portland Harbor. It is one of the four Colonial lighthouses that have never been rebuilt.

A Landmark of Quality in the field of electrochemicals is the name Niagara Alkali Company. First to produce several of these important chemicals in America, Niagara is a pioneer in their development and application. You can rely on Nialk® Liquid Chlorine, Nialk Caustic Potash, Nialk Carbonate of Potash, Nialk Paradichlorobenzene, Nialk Caustic Soda, Nialk TRICHLORethylene, Niagathal® (Tetrachloro Phthalic Anhydride).

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materials

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Industrial Crystals and all common grades.

MONOHYDRATED COPPER SULFATE

35% Copper as metallic packaged in steel drums at no extra cost.

COPPER CARBONATE

35% Copper as metallic light and dense grade.

COPPER HYDRATE

43% Copper as metallic highly reactive.

CUPRIC CHLORIDE

37% Copper as metallic. Available in poly-lined drums or bags.

CUPRIC OXIDE

Minimum 76% Copper as metallic. Technical grade. NOT A BY-PRODUCT.

MANGANESE SULFATE

15% Mn SO₄. Designed specifically for inclusion in mixed fertilizers.

MONOHYDRATED MANGANESE SULFATE

92% Mn SO₄. H₂O. High-purity, technical grade. NOT A BY-PRODUCT.

MANGANESE OXIDE

Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

MANGANESE CARBONATE

43% Manganese as metallic. A more dense Manganese Carbonate. Specific gravity 3.1.

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Partially hydrated, free-flowing granular form. Contains 20.5 water soluble Iron. Available in bags or bulk.

Samples, Specifications and Detailed Information Upon Request—

TENNESSEE



CORPORATION

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When inquiring check CP 3443 opposite last page

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36% Zinc as metallic. For agriculture and industry.

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We mine and are basic producers of Copper, Iron, Zinc and Sulfur. Our technical knowledge in these basic materials and their chemical derivatives is your assurance of exacting quality control and strict uniform consistency.

CHLOROSULFONIC ACID

Iron less than 1.0 ppm as loaded. Water white, bulk delivery in glass-lined or stainless steel tank wagons, also in stainless steel drums.

PARA TOLUENE SULFONIC ACID, ANHYDROUS

Other organic Sulfonic Acids.

Three basic formulas are . . .

starting points for superior baking enamels

finishes have extreme hardness, good flexibility, excellent water resistance, and outstanding color retention

Starting points for development of superior baking enamels are polyesters that contain only the necessary side groups required for solubility and cross-linking. These may prove to be the best route to formulate improved baking finishes which have extreme hardness, good flexibility, excellent water resistance, and outstanding color retention.

As starting points for this type of polyester, two "backbone" formulations are suggested. These are formulations "A" and "B" in the table, and are intended to be further reacted with urea or melamine formaldehyde resins.

A modification of these formulations is the reaction product of three mols of Isophthalic with four mols of trimethylolethane or trimethylolpropane. This mixture can be cooked to a low acid number in a few hours. Resultant product is a highly functional resinous alcohol which has interesting possibilities.

Suggest adding propylene glycol

One very recently suggested formulation is that shown by "C" in the table. This is based on significant proportions of propylene glycol. When baked, it yields a resin which may be considered an oil-modified alkyd of 25% oil length in which the modifying oil is the ester of 2-ethyl hexoic acid and trimethylol ethane. At an acid number of 12, there are 5.8 parts excess polyol per 100 parts resin.

Formulation "C" is also a "backbone" structure which may be combined with formaldehyde resins (such as Rohm & Haas' F-200E) or with suitable amino resins. These mixtures constitute a finished "vehicle" for baking finishes.

By substituting pelargonic, lauric, or natural coconut oil fatty acids for part or all of the 2-ethyl hexoic acid in formulation "C", a broader range of com-

Suggested starting formulations for baking enamels

	Parts by Weight		
	A	B	C
Pelargonic acid	263		
Benzoic acid		102	
2-Ethyl hexoic acid		347	218
Glycerol (anh.)		298	
Trimethylolethane		348	250
Propylene glycol			126
Oronite Isophthalic	487	434	553

Excess polyol (parts/	100 resin)	4.1	4.2	5.8

patibilities with amino resins may be obtained.

In addition to these uses, preliminary indications are that these structures will provide superior plasticizers for nitrocellulose lacquer-type industrial finishes. Lacquers of higher solids content and improved stability are expected to be obtained in this way.

(Isophthalic is a product of Oronite Chemical Co., Dept. CP, 200 Bush St., San Francisco 20, California . . . or for more information about manufacturer's product reader may simply check CP 3444 on the convenient Reader Service slip which is located opposite last page.)

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Concentrated H₂O₂ is more than 99.6% pure

Secret of process is continuous fractional crystallization

Uses: Product should open new vistas for peroxide applications.

Features: Not only is the practical maximum concentration of the material above 99.6% H₂O₂, but the manufacturing process also gives a product having very little impurities, far below that allowed by current ACS reagent specs.

The rate of concentration loss is very low. At room temperatures, the high purity peroxide decomposes at a rate corresponding to less than 1% concentration loss per year. (Peroxide must be protected from contamination, however, because this may cause rapid decomposition.) Given intelligent care, the high purity product is easy and safe to handle.

Description: Process depends upon continuous fractional crystallization, using 90% H₂O₂ as feed stock. The solid phase, which becomes progressively higher in H₂O₂ content, moves countercurrent to a liquid phase that becomes progressively lower in peroxide content. Take-off concentrations can be regulated somewhat, but the practical maximum concentration is above 99.6% H₂O₂. Physical properties for three concentrations are compared in the table below:

	H ₂ O ₂ Concentration (wt %)		
	90	95	100
Gm H ₂ O ₂ /l (@ 25°C)	1245	1243	1442
"Vol concentration" (approx)	412	445	446
Active oxygen (wt %, approx)	42.3	44.7	47.0
Sp gr (25°/4°C)	1.387	1.414	1.442
Bp (°C @ 1 atm)	141	146	150
Freezing point (°C)	-11.5	-5.6	-0.4
Viscosity (cps @ 25°C)	1.153	1.156	1.156
Refractive index (@ 25°C)	1.398	1.402	1.407
Dielectric constant (@20°C)	77	75	73
Surface tension (dynes/cm @ 20°C)	79.3	79.9	80.4
Total vapor pressure (mm Hg @ 25°C)	3.4	2.6	1.95
Partial pressure of H ₂ O ₂ (mm Hg @ 25°C)	1.6	1.8	1.95
Heat of dilution (cal/gm mol of H ₂ O ₂ @ 25°C)	656	736	819
Adiabatic decomposition temp (°C)	740	867	996

When the peroxide decomposes, 23.4 Kcal/gm mol of H₂O₂ are liberated. One liter of peroxide

(Please turn to page 43)



for fruit and vegetable growers.

NEW HELP ON BACTERIAL BLIGHT



Recent greenhouse studies by scientists at Merck & Co. Inc., show that addition of Glycerine to streptomycin sprays increases the effect of the antibiotic against bacterial blight of beans, a disease which costs farmers millions of dollars each year.

Researchers believe the increased effectiveness of the combined spray comes from Glycerine's ability to retain moisture on leaves, and in so doing, to improve absorption of streptomycin by the plant.

Indications are that the Glycerine-streptomycin combination will also help control other disease-causing organisms which infect leaves, flowers and stems of various fruits and vegetables.

This is only one of Glycerine's many applications in agriculture and industry. The unique balance of properties that has won such wide acceptance for Glycerine in the past continues to open new doors to chemical progress. In paints, foods, pharmaceuticals, packaging . . . for tomorrow's surge of new specialties . . . in formulations and reactions yet unknown, nothing takes the place of Glycerine.

This balanced group of properties keeps

Glycerine's usefulness growing

HYGROSCOPICITY • STABILITY •
SOLVENT POWER • VISCOSITY • NONVOLATILITY •
NONTOXICITY • TASTE • MW/HYDROXYL RATIO •

HUMECTANT •
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and applications

For your free copy of any or all of these booklets write: GLYCERINE PRODUCERS' ASSOCIATION • 295 Madison Ave., New York 17, N.Y.

When inquiring check CP 3445 opposite last page

Uvinul® 488 498

ULTRAVIOLET ABSORBERS which are added to plastics and protective coatings to prevent deterioration and discoloration caused by ultraviolet light.

*Uvinul*s filter out ultraviolet radiation to permanently protect the substrate, or to stabilize the vehicle or medium from degradation.

*Uvinul*s are used in clear nitrocellulose lacquer films to retard darkening of natural and chemically-bleached furniture woods. Also in polymethyl methacrylate to filter ultraviolet radiation and reduce crazing of the sheet caused by decomposition products.

*Uvinul*s in transparent cellulose acetate sheets used as screens for ultraviolet sensitive materials, such as display merchandise, photographic prints, foods, etc. Also in translucent, opaque, clear or colored sheets to stabilize selected colors against ultraviolet fading.

*Uvinul*s in polyester resins prevent discoloration and deterioration on long exposure to sunlight. Also in waxes, polishes, oils, creams, aerosols or various film forming products to protect a wide range of substances or surfaces against degradation.

*Uvinul*s prevent deterioration of many water and oil soluble dyes, perfumes and other additives in packaged liquids, creams and pastes. Also as an eye protecting filter in transparent plastics for sun glasses, safety glass and other eyeshields.

Write today for complete information on UVINULS.

From Research to Reality.

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MATERIALS

Keeps viscosity low during emulsion polymerization and concentration . . .

doesn't impair surface tension lowering

Uses: In emulsion polymerization stabilizing and keeping viscosity low during polymerization and concentration.

Features: With many soap-like properties, it does not impair surface tension lowering and is low in froth production. It can disperse many materials.

Description: The water-soluble polymeric soap has a mw of about 30,000, and comes in a 10%-active aqueous solution that's medium tan in color.

(Called AK-534, product is supplied by General Latex and Chemical Corp., Dept. CP, 666 Main St., Cambridge 39, Mass. . . . or for more information check CP 3446 on form which is located opposite last page.)



Flushed colors for paints

Series of flushed colors which contribute higher gloss to paint films and longer gloss retention are described in six-page pocket-size folder. A listing of color standards that are available is given along with fifty-four color chips representing full color masstones made from official pigment standards.

"Flushed Colors for Paint and Lacquer Manufacturers" is issued by The Hilton-Davis Chemical Co., Div. of Sterling Drug Inc., Dept. CP, 2235 Langdon Farm Road, Cincinnati 13, Ohio. When inquiring check CP 3447 on form opposite last page.

For more information on product at left, specify CP 3448 . . . see information request blank opposite last page.



MATERIALS

(Continued from page 41)

yields about 677 gm O₂ and 765 gm steam. Under adiabatic conditions, temperature of products is about 996°C and volume about 6600 l at this temp and one atm pressure. Specific impulse (about 140 sec) can be about doubled by burning fuel in the decomposition product.

(SP "100" hydrogen peroxide is a product of Becco Chemical Div., Food Machinery & Chemical Corp., Dept. CP, Station B, Buffalo 7, N.Y. . . . or for more information check CP 3449 on form opposite last page.)

Imparts greater color stability to white enamels produced at high baking schedules . . .

non-oxidizing alkyd resin provides hardness — mar and soap resistance

Uses: To improve baking properties and service characteristics of high quality, white baking enamels such as used on household appliances.

Features: Resin imparts greater color stability to white enamels produced at high baking schedules or used at high service temperatures. In addition, enamels have excellent hardness and mar resistance, and high alkali and soap resistance.

Description: The non-oxidizing alkyd resin has these physical constants:

Solids (%)	60 ± 1
Solvent	Xylo
Acid number (solids)	6-10
Weight per gallon (lb)	8.5
Control viscosity (40% in Xylo)	D-F
Color (Gardner, max)	5

Compared with formulations based on current high quality alkyd resins, enamels made with this alkyd offer these advantages:

- 1 — Tukon hardness is 50-100% greater when baking temperatures are 200-300°F
- 2 — After 16 hr at 400°F, gloss retention is 150% better
- 3 — After the same exposure, whiteness retention is 100% higher on Photovolt comparator
- 4 — Blistering from prolonged immersion in hot solutions of household soaps and synthetic detergents is substantially reduced

Enamels may be applied by spraying or dipping. Xylo, toluol, high flash naphtha, or butyl alcohol may be used as solvents.

(Duraplex ND-76 is a product of The Resinous Products Div., Rohm & Haas Co., Dept. CP, 712 Locust, Philadelphia 5, Pa. . . . or for more information reader may simply check CP 3450 on form which is located opposite last page.)

At your call...



2-ethylhexyl alcohol

2-ethylisohexyl alcohol

Tecsol®
proprietary ethyl alcohol
95% and anhydrous

n-butyl acetate

isobutyl acetate

ethyl acetate

isobutyl alcohol

isopropyl acetate

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Most Eastman solvents are stored in bulk in the major industrial centers of the United States. Write for information or call your Eastman representative.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; Houston; St. Louis. **West Coast:** Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

When inquiring check CP 3451 opposite last page

Another new development using

B. F. Goodrich Chemical raw materials



B. F. Goodrich Chemical Company does not make these panels. We supply only the raw materials.

Rigid vinyl windows beat double trouble

WHAT do you do when windows are attacked from two sides? By corrosive fumes and hot air inside, and outside by the weather. A chemical plant in Texas had the problem and found the answer. In went new translucent panels made from Geon rigid vinyl—out went the old windows and a costly maintenance problem!

Installing the green-tinted corrugated panels was easy—they were simply nailed in place. Because they are made from Geon, they resist sunlight, cold, rain, acids, alkalis,

oil and grease. They are decorative as well as functional.

Products made from Geon rigid vinyl include corrosion-proof pipe, fume ducts, tanks, trays, materials that can be machined, planed, sawed, drilled, and cemented. You'll find other Geon polyvinyl materials in flexible, colorful upholstery, in high-dielectric insulation, in wear-resistant flooring, in hundreds of other successful products.

Geon's remarkable physical and chemical properties may give your products a decisive competitive edge.

GEON RESINS • GOOD-RITE PLASTICIZERS...the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check CP 3452 opposite last page



MATERIALS

Gives formulations of coprecipitated lignin-rubber reinforcing agent

Eight formulations of Polypol S-70, a coprecipitate of lignin and a butadiene-styrene copolymer, in semi-hard rubber compounds are given in data sheet. Typical cured properties and estimated cost figures are included.

Bul No. 203 is issued by Polychemicals Div., West Virginia Pulp & Paper Co., Dept. CP, Charleston A, S.C. Specify CP 3453 opp. last page.

Versatility in reactivity marks ethylene imine as promising comers...

use in paper and textile industries seen

Ethylene imine, NHCH_2CH_3 , is characterized by properties typical of secondary amines, although these are somewhat modified by its heterocyclic nature and the fact that the ring can be easily split. It is readily soluble in many liquids, and — being an extremely reactive compound — undergoes many reactions, including polymerization. Its derivatives, too, are many, reactive, and interesting.

The imine and certain derivatives (like the polymer) should find use in the paper industry to improve wet strength and abrasion resistance. In the textile industry, the anti-swelling properties imparted to rayon and cotton have been recognized, as has its anti-static properties with vinyl resin textiles. With it, resin-impregnated cellulose materials can be dyed by wool-dyeing processes.

Condensation products with organic acids, anhydrides, or esters, are recommended as addition agents to rayon baths for many operations and as water repellents.

The compound is an accelerator for rubber, and an anticorrosion and anti-sludging agent in lube oils. Not only can it be used as an active intermediate to make many organic compounds and medicinals, but its addition in typical organic reactions can promote emulsifying, alkylating, active anion exchange, and stabilizing of organic halogen compounds.

Typical properties of ethylene imine are:

Purity (wt %)	98 ± 1
Sp gr (20°/4°C)	0.832
Index of refraction (n_D^{20})	1.4123
Sp refraction (@ 19°C)	0.2996
Molecular refraction	12.91
Bp [°C] @ 756 mm)	56-57
Freezing point [°C]	-71.5
Vapor pressure (mm @ 20°C)	160
Heat of formation (Kcal)	-21.95

Compound is very corrosive and toxic and must be handled carefully. Carbonate- and borax-free

MATERIALS

glass, Teflon, polyethylene, lead, and low-carbon steel can be used to contain the oily liquid. It is quite stable when stored in glass in contact with small quantities of solid NaOH. The anhydrous product at purity of 99+ % is quite stable. (Ethylene imine is produced in semi-commercial quantities by Chemirad Corp., Dept. CP, PO Box 152, Port Washington, N.Y. . . . or for more information check CP 3454 opposite last page.)

Highly compressible, oil-resistant rubber-sized fiber is suited for gasket, packing uses . . .

made by precipitating Hycar on paper fibers

Uses: In addition to its known use in gasketing, material shows promise as a packing, facing material, possible substitute for rubber-coated paper.

Features: The fiber has a friction coefficient 30 to 50% higher than that of standard vulcanized fiber and also has improved chemical resistance. This rubber-sized fiber is about 70% more compressible and 69% more resistant than vulcanized fiber. Oil does not affect either the fiber or rubber components.

Description: Rubber-sized fiber is made from precipitating Hycar-type synthetic rubber directly on paper fibers, in contrast to other types which can only be coated on paper surface. Uniform dispersion of Hycar throughout the vulcanized fiber helps abrasion resistance since surface coating doesn't wear off.

Fiber comes in 0.015 to 0.375 inch thicknesses. NEMA standards for sheet sizes and thickness tolerances apply. Typical properties for a 0.109" thick fiber conditioned per ASTM D-619, 48 hr @ 50°C, and tests conducted at 73°C and 50% RH follow:

Tensil strength (psi)	
MD	11,500
CD	8,500
Water absorption (%)	
After 2 hr	18.0
After 24 hr	50.0
Compressive strength (psi)	26,000
Rockwell hardness (R-scale)	47
Impact strength (Izod, ft-lb/in notch)	
MD	2.0
CD	1.8
Compressibility (in/in of original thickness)*	0.109
Recovery (in/in of original thickness)	0.073

*Test performed on one-inch sq specimen by applying load to $\frac{1}{2}$ -inch sq area at rate of 0.1 in/min to 3000 lb

(Type RS-10H rubber-sized fiber is a product of National Vulcanized Fibre Co., Dept. CP, 1055 Beech St., Wilmington, Del. . . . or for more information check CP 3455 opposite last page.)

PICCOPEALE — A new, low-cost, large production, high quality petroleum resin. Clear, clean, transparent, compatible, thermoplastic, readily soluble. Available solid, flaked or in solution.

PICCOLYTE — A pure hydrocarbon, pale, non-yellowing, thermoplastic, terpene resin that is low in cost, soluble in low cost naphthas, chemically inert, compatible with waxes, resins, paint and varnish oils.

PICCOMARON — A series of thermoplastic, para-coumarone, indene resins, soluble in coal tar, turpentine, terpene and most chlorinated solvents. Inert to all except strong concentrated acids.

PICCOLASTIC — Piccolastic Resins are pale, unsaponifiable, stable in package, body and film, soluble in low-cost solvents, acid and alkali resistant. Permanently thermoplastic.

SOLVENTS and SOLVENT OILS — A complete series of aromatic petroleum naphthas, coal tar naphthas, heavy naphthas, coal tar heavy naphthas, solvent oils and heavy oils.

PICCO PRODUCTS

SYNTHETIC RESINS AND SOLVENTS

TECHNICAL SERVICE — Pennsylvania Industrial Chemical Corporation operates an exceptionally well-equipped laboratory for technical research which can be of great help in developing the best methods of using Picco products in your formulations.

Pennsylvania Industrial Chemical Corp. (CP)
Clairton, Pennsylvania

Please send me a copy of your bulletin describing Picco Products and samples of grade for (application).

Name _____

Position _____

Company _____

Address _____

Pennsylvania Industrial Chemical Corp.

Clairton, Pennsylvania

Branches:

Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

Other Sales Offices

New York, Chicago, Philadelphia, Pittsburgh, Detroit



When inquiring check CP 3456 opposite last page

Fluid bed CATALYSTS

. . . and catalyst support grades of activated charcoal have been developed to meet the requirements of high surface areas and extreme hardness to resist abrasion.

FIXED BED APPLICATIONS

also employ ADSORBITE activated charcoal as the catalyst or support media.

REACTIVATION CUTS COSTS

In many cases, we can recover for re-use the activated charcoal at a fraction of the purchase price.

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Company
CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec

When inquiring check CP 3457 opposite last page

The Smart Trend in

PVA EXTENDERS

Tamms GOLD BOND SILICA

A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersible. pH of 6.5-6.8. Non-crystalline structure. Economical in cost.

TAMMS INDUSTRIES, INC.

When inquiring check CP 3458 opposite last page

keeping up with

SODIUM

Sodium handling in the plant

new book describes how

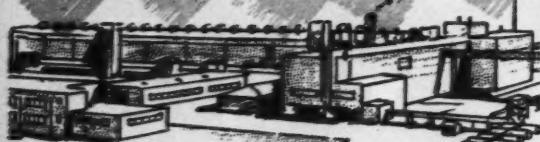
THIS BOOK IS FOR ENGINEERS AND PRODUCTION MEN WORKING IN DESIGN, DEVELOPMENT AND OPERATION OF SODIUM HANDLING EQUIPMENT.

CONTAINS INFORMATION SUCH AS—

- DETAILS OF TYPICAL SODIUM-USING PROCESSES
- DETAILS OF EQUIPMENT INSTALLATION, INSULATION, HEATING, REPAIR
- RECOMMENDATIONS FOR SODIUM PUMPING, METERING, INSTRUMENTATION
- SAFETY IN DESIGN AND OPERATION

FOURTY-FOUR PAGES OF DETAILED INFORMATION ON SODIUM HANDLING BASED ON IN-PLANT EXPERIENCE. NO SUBSTITUTE FOR DIRECT U.S.I. TECHNICAL ASSISTANCE, THIS BOOK WILL NEVERTHELESS PROVIDE THE READER WITH A SOLID FOUNDATION IN THE PRINCIPLES AND PRACTICES OF SODIUM ENGINEERING. AVAILABLE FROM U.S.I. WITHOUT CHARGE.

a heap of
SODIUM
produced each year



WELL OVER A HUNDRED THOUSAND TONS OF SODIUM ARE USED IN THE UNITED STATES EVERY YEAR. 140 MILLION POUNDS GO INTO TETRAETHYL LEAD; ABOUT 45 MILLION INTO SODIUM CYANIDE; ALMOST AS MUCH INTO FATTY ALCOHOLS; 7 TO 10 MILLION INTO SODIUM PEROXIDE; ABOUT 4 MILLION INTO SODIUM HYDROGEN DESCALING OF STEEL; AND ABOUT 4 MILLION FOR INSECTICIDES, DYES, DRUGS, ALKOXIDE PREPARATION, SPECIALTY CHEMICALS, ATOMIC ENERGY AND A NUMBER OF MISCELLANEOUS USES. AND NOW TITANIUM METAL, "U.S.I. ISOSEBACIC" ACID AND MANY ORGANICS ARE JOINING THE LIST.

U.S.I. TECHNICAL SERVICE HAS BEEN CALLED ON BEFORE OR DURING DESIGN OF ALMOST EVERY NEW SODIUM HANDLING UNIT BUILT DURING THE PAST FEW YEARS. THE SAME SERVICE IS AVAILABLE TO YOU IN ALL PHASES OF YOUR DEVELOPMENT, DESIGN, AND PRODUCTION.



DID YOU KNOW

- THAT MILD STEEL IS SATISFACTORY FOR MOST SODIUM HANDLING EQUIPMENT?
- THAT SODIUM PIPELINES CAN BE CUT AND REWELDED WITHOUT DRAINING?
- THAT SODIUM BRICKS ARE MOLDED IN OPEN AIR?
- THAT MOLTEN SODIUM CAN BE PUMPED AND METERED CONTINUOUSLY?
- THAT THE ATOMIC ENERGY COMMISSION HAS STUDIED OVER 60 CONSTRUCTION MATERIALS FOR SODIUM HANDLING?

RESULTS OF THE A.E.C. STUDIES, ALONG WITH MANY OTHER DETAILS OF SODIUM HANDLING TECHNOLOGY, ARE PRESENTED IN U.S.I.'S NEW BOOK. ASK FOR NEW U.S.I. SODIUM HANDLING BROCHURE.

U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers Products Corporation
99 Park Avenue, New York 16, N. Y.
Branches in principal cities

When inquiring check CP 3459 opposite last page

MATERIALS

Formulations of highly refined lanolin have increased shelf stability, don't leave sticky films . . .

tests indicate that product is not an irritant, skin fatiguer, nor sensitizer

Uses: In pharmaceutical and cosmetic formulations, such as ointments and creams, hand creams, lipsticks, hair dressings and lacquers.

Features: Compound has unusual solubility in a wide range of materials. It can be used in aerosols because it does not block valves. Higher concentrations can be used in preparations since it does not leave a sticky film and is more soluble than lanolin. Tests indicate that it is not an irritant, a skin fatiguer, nor a skin sensitizer. Since the material stays in solution at lower temperatures than lanolin, its formulations have increased stability and shelf life.

Description: This non-sensitizing fraction of USP lanolin in liquid form meets all USP specs except for melting point, which is lower. Cholesterol and sterol content of the lanolin remain unaltered by manufacturing process. The bland, non-tacky, amber-colored oil has a lower molecular weight than conventional lanolin. Specifications are:

Free fatty acid (% max)	0.56
Total sterols (unsaponifiable content, %)	50-60
Cholesterol in unsaponifiable (bp, %)	30-35
Cholesterol in lanol (%)	20
Color (ASTM)	2-2 1/2
Loss on drying (24 hr @ 220°F %)	None
Ash (%)	0.02
Iodine value (USP)	18-36
Cloud point (ASTM D-97-47, °F max)	64
Pour point (ASTM D-97-47, °F max)	50

(Lantrol is a product of Malmstrom Chemical Corp., Dept. CP, 259 Parkhurst St., Newark 5, N.J. . . . or for more information check CP 3460 on form opposite last page.)

Offers brochures describing technical publications

Publisher makes three descriptive brochures available:

- 1 — A 52-page brochure describing "Elsevier's Encyclopedia of Organic Chemistry", is a compendium of carbon compounds, their chemical, physical, and chief physiological properties.
- 2 — A 30-page catalog listing publisher's scientific and technical books.
- 3 — An eight-page brochure that describes the "Chemistry of Carbon Compounds" series.

These brochures are issued by Elsevier Press, Inc., Dept. CP, 2330 Holcombe Blvd., Houston 25, Texas. When inquiring check CP 3461 on form opposite last page.

MATERIALS

Brilliant white epoxies offered for coating and laminating . . .

resins are dimensionally stable and thermosetting

Thermosetting modified epoxy resins for laminating and coating are brilliant white compounds with excellent dimensional stability.

Laminating resin, L-904, demonstrates good liquid life properties. It has high impact, flexural, compressive, and tensile strength and can be handled and applied using standard laminating techniques.

Coating resin, L-914 Gelcoat, hardens to a high gloss on a laminated surface at ambient room temperature. It is especially suited for achieving continuity of surface properties and has excellent hanging properties.

(Resins L-904 and L-914 are products of Rezolin, Inc., Dept. CP, 4825 W. Jefferson Blvd., Los Angeles 16, Calif. . . . or for more information check CP 3462 on form which is located opposite last page.)

Tells much about aqua ammonia

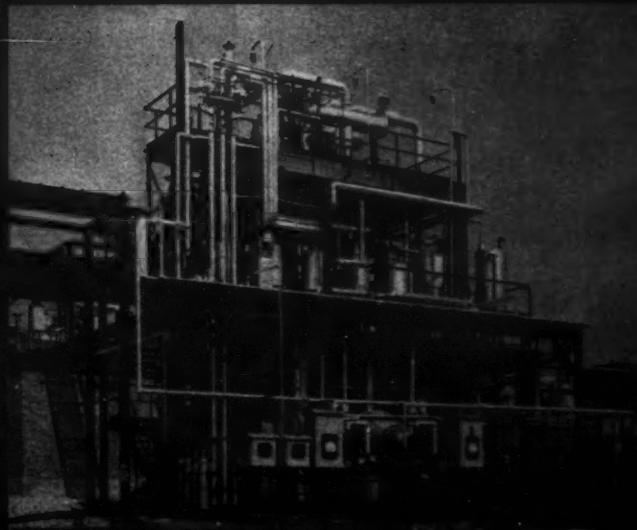
Six-page technical data sheet, punched for notebook insertion, gives a thorough coverage of the information available on aqua ammonia. Eight detailed tables cover its physical properties, and two pages of text describe handling and storage, toxicity, and first aid.

TDS No. 4 is issued by Agricultural Chemicals Sales Dept., Commercial Solvents Corp., Dept. CP, 260 Madison Ave., New York 16, N.Y. When inquiring check CP 3463 on form opposite last page.

For more information on product at right, specify CP 3464 . . . see information request blank opposite last page.

Coming to our Moundsville W. Va. plant...

DOUBLE CAPACITY!



for the production of high quality

ANILINE

After only a year of commercial production, we are doubling the output of our Aniline plant at Moundsville to meet the demand of quality-minded Aniline users.

Made by a continuous catalytic hydrogenation process developed in National Aniline Laboratories, this aniline sets a new standard in the industry. It is water white . . . extremely pure and uniform . . . meets or exceeds the A.C.S. Specification for C.P. Aniline.

Because of our strategic location on the Ohio River you can be sure of dependable delivery by rail, truck or inland waterways. We will be pleased to furnish samples, specifications, price and delivery quotations.

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Boston Providence Philadelphia Chicago San Francisco
Portland, Ore. Greensboro Charlotte Richmond Atlanta
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto



HOW

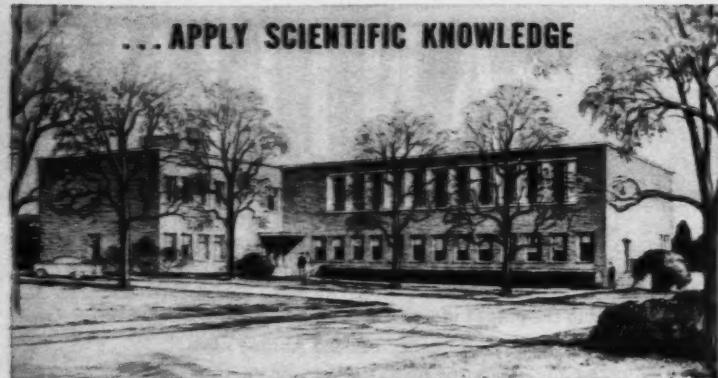
HERCULES

HELPS...

IN HEAVY TRAFFIC AREAS like this, floor tiles must be built to take a beating. Whether the tiles are of the rigid, mastic type or flexible flooring based on rubber or vinyl, Hercules Neolyn®, Mastolyn® or Staybelite® resin can contribute to lower processing costs and better wearing qualities. The wide variety of properties offered by these resins assures that there is one best suited for every floor tile formulation.



...APPLY SCIENTIFIC KNOWLEDGE



► **MORE THAN 17,000 VOLUMES** of scientific literature and tens of thousands of company research reports will be housed in this new \$1,000,000 Technical Information Center at the Hercules Experiment Station near Wilmington. In addition, the structure will provide quarters for the many technical specialists who serve the scientific information needs of the Hercules research staff—making the Center one of the nation's most complete information services to an industrial research organization.

WHICH HAD THE TREATMENT? The clean, un-splintered piece has been treated with Hercules Paracol® wax emulsion, making it possible to use every inch of lumber that has been pre-cut at the mill. The untreated piece (top) is badly "checked" and a portion of the end must be discarded before it will be suitable for use.



HERCULES

CHEMICAL MATERIALS FOR INDUSTRY



HERCULES POWDER COMPANY

INCORPORATED
940 Market St., Wilmington 99, Del. Sales Offices in Principal Cities

**SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS,
ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS,
EXPLOSIVES, AND OTHER CHEMICAL PROCESSING MATERIALS.**

When inquiring check CP 3465 opposite last page

MATERIALS

Hardener gives epoxies fire resistance and high-temp strength

Products retain their good electrical properties at high temperatures, and raw material costs should be low

Uses: Major use should be in hardening and imparting desired qualities to epoxy resins. There is much interest in using it to make casting and potting compounds, backings for printed electric circuits, and as varnish-type insulation coatings for electrical equipment. Application in glass-reinforced laminates should be advantageous.

Features: Hardener contributes to properties previously unavailable together, namely fire resistance and high temperature strength. Products made with the hardener can be used at higher temperatures and under more severe conditions without distorting and without danger of fire.

Additional advantages: Epoxies made with this hardener have good electrical characteristics and retain them at high operating temperatures. Raw material costs for making resins should be lower than with many other hardeners, due to the high ratio used and anhydride's lower cost than epoxies. No dermatological effects have been observed.

Description: Made on semi-works scale, hardener is formed by reacting hexachlorocyclopentadiene with maleic anhydride. Called HET Anhydride,* it is a white powder, slowly hygroscopic at room temperatures. Its mw is 370.85 and it contains 57.4% chlorine.

Because it melts at 239-240°C, it is usually added as a powder to a heated resin and dissolved with vigorous stirring. Fast acting, it hardens epoxies quicker than phthalic anhydride. Liquid epoxies require lower solution temperatures than solid types, and are usually preferred.

For comparison of HET- and phthalic anhydride-hardened resins, two sets of clear castings were made — identical except for the hardener. Both were made with 100 parts of Ciba's Araldite® 6020 (epoxide number of 210) and cured for 24 hr at 120°C. Formulation A is made with 100 parts HET Anhydride; formulation B, with 40 parts phthalic anhydride. (See table at top of next page.)

To make high-strength resin-glass cloth laminates, HET Anhydride and epoxies are dissolved in a mutual solvent, forming an impregnating solution. After impregnation of the glass cloth, solvent is removed at moderate temperatures. Several layers are

*HET is a registered trade mark of Hooker Electrochemical Co. Chemically, HET Anhydride is 1,4,5,6,7,7-hexachlorobicyclo [2.2.1]:5-heptene-2,3 dicarboxylic anhydride

MATERIALS

	A HET-hardened Epoxy	B Phthalic- hardened Epoxy
Heat distortion point (ASTM D-648-48T, °C) ¹	143-144	67
Tensile strength (cured at 140°C, psi)	12,000	—
Barcol hardness	46-50	35
Burning rate	0.15	1.17
ASTM D-757-49 (in/min)	self-extinguishing	flammable
ASTM D-635-44		
Sp gr	1.43	1.25
Shrinkage during cure (%) by vol)	1.3	2.3
Weight loss (@ 200°C)	0.7	1.5
After 7 days (%)	4.0	2.7
After 30 days (%)		
Pot life of resin (hr @ 120°C)	1/2	6

¹Note: Heat distortion point depends on cure time and temp. It's about 187°C for a 24 hr cure at 180°C.

then laminated using heat and pressure.

Table below shows how flex properties and modulus of elasticity hold up at high temperatures. Data are for a 12-ply laminate of 181 Volan A glass cloth containing about 30% resin. Cure was two hours at 356°F. Specimens were held at temperature for one-half hour and tested at this temperature.

Temp (°F)	Flex Strength (psi)	Modulus of Elasticity (psi)
73	87,900	4.17 x 10 ⁶
280	75,500	3.28 x 10 ⁶
350	73,500	3.33 x 10 ⁶
400	29,800	2.22 x 10 ⁶
500	9,700	1.20 x 10 ⁶

(HET Anhydride is a product of Hooker Electrochemical Company, Dept. CP, PO Box 344, Niagara Falls, N.Y. . . . or for more information check CP 3466 on form opposite last page.)

Present data on pentaerythritol and tripentaerythritol

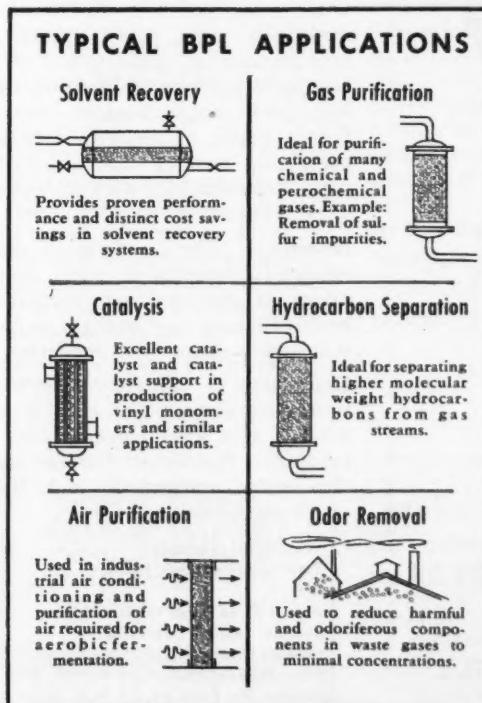
"Monopentek," a colorless, coarse, crystalline powder, consisting of about 98.5% pentaerythritol and 1.5% dipentaerythritol is described in eight-page bulletin. Specifications and reactions are given. Forty literature references are in bibliography.

"Tripentek," a technical grade of tripentaerythritol containing about 10% of related polyhydric alcohols, pentaerythritol, and dipentaerythritol, is a raw material for use in resins for protective coatings and printing inks. In addition to the detailed applications, bulletin gives processing hints, specs, and properties. Bibliography has twenty-one references.

Both bulletins are issued by Heyden Chemical Corp., Dept. CP, 342 Madison Ave., New York 17, N.Y. Specify CP 3467 opposite last page.



Here's how to solve your VAPOR PHASE ADSORPTION PROBLEMS with Pittsburgh Activated Carbon



PITTSBURGH Type BPL Granular Activated Carbon is specifically designed to solve vapor phase adsorption problems more efficiently and at appreciably lower cost than any other similar material. Made from a selected grade of bituminous coal under rigidly controlled conditions, Pittsburgh BPL offers you these important advantages:

1. Controlled pore size.
2. High surface area.
3. High density—high volume activity.
4. Chemical inertness.
5. High thermal stability
6. Range of mesh sizes.

And, due to its unique raw material base, Pittsburgh BPL Granular Activated Carbon costs far less than other carbons of equivalent performance characteristics.

Write today for samples and full information on prices and specifications of Pittsburgh BPL Activated Carbon.



COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

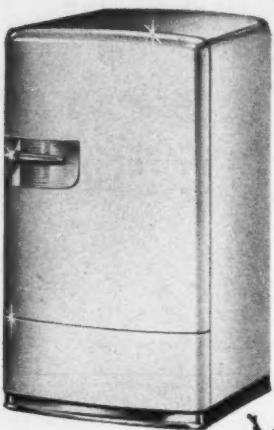
When inquiring check CP 3468 opposite last page

THE ODD CARBON MAKES PELARGONIC ACID DIFFERENT

for example: **Emfac®**

Pelargonic Acid

*Improves High-Bake
Enamels 4 Ways!*



In this use in alkyd resins, the unique properties of pelargonic acid result in four distinct advantages over lauric and other coconut derived fatty acids. In addition to faster cooking of the resin itself, films of white enamel made from pelargonic acid are harder, exhibit higher gloss, and possess greater resistance to yellowing.

As in the application above, Emfac Pelargonic Acid may give your product just the competitive advantage you've been striving for... or, it may be the answer to a possible problem of stability, melting point, solubility or consistency. Why not check this C₉, saturated, liquid, monobasic acid and see if it can give you a competitive advantage.

Write for sample or mail coupon
for descriptive literature.

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<input type="checkbox"/> Use of Pelargonic in High-Bake Enamels	
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Address.....	
City.....	State.....

When inquiring check CP 3469 opposite last page

MATERIALS

Covers standards, specs of metal powders

Correlated listing of all commercially available standards, specifications, and other references on metal powders and metal powder products are given in four-page data sheet. Bibliography is grouped according to publications pertaining to metal powders, metal powder bearings, metal powder structural parts, electronic cores, and electrical contacts. Pertinent differences between standards issued by different organizations are pointed out.

Data Sheet No. 4 is issued by Metal Powder Association, Dept. CP, 420 Lexington Ave., New York 17, N.Y. Specify CP 3470 opp. last page.

Enhanced water resistance with butadiene-styrene copolymer latex . . .

applications in adhesives, coatings, saturants, and electrical insulation seen

Uses: To improve water resistance of adhesives which are used in paper lamination, carton adhesives, paper-to-foil adhesives, and in flocked products. It has utility in functional or decorative coatings on wood, plaster, fabrics, paper and for fiber bonding of tufted fabrics or upholstery, especially if products are wet processed after coating. Latex can be used as saturant for woven fabrics, paper, or unwoven fabrics and for impregnating masking tape, artificial leather, and paper. Electrical insulation improvements are also to be obtained.

Features: The copolymer is designed to give enhanced properties of water resistance. In saturants, it develops such properties as ease in heat sensitizing, wet strength improvement, abrasion improvement, and moderate oil resistance.

Description: Synthetic latices are butadiene-styrene copolymers. First member of series, called 8-VX-5, is a 45% butadiene-55% styrene latex copolymer. It does not have an antioxidant. Surface tension is moderately high. It has these typical characteristics:

Weight/gal (lb/gal)	8.3
Total solids content (wt %)	39
pH	11.0
Ash (1% on total solids)	0.41
Surface tension (dynes/cm)	55
Mooney (ML-4)	90
Free styrene (%)	0.13
Filtrability (cc)	300
Viscosity (Brookfield #1 spindle @ 6 rpm)	20
Film-water spotting	None

Latex can be supplied in specific compounds and with specific properties, if desired.

For paper coatings, the latex can be extended

THE IMPORTANCE OF PIGMENT PARTICLE SIZE

Color, tinting strength, hiding power, oil absorption, dispersibility, ease of grinding, suspension, freedom from abrasion, reactivity — these and other essential properties of pigments and extenders are directly related to pigment particle size.

In Williams' synthetic pigments—Kroma Reds; Pure red, yellow, black and brown iron oxides; chromium oxides; and Albacar calcium carbonates—particle size is carefully controlled at time of manufacture. Oversize is eliminated. Each of these types is available in a broad range of particle sizes.

In natural pigments, Williams produces specially sized materials, including VVF red oxides, metallic browns, siennas, umbers, and Sparmite (super fine Barytes). Here again, oversize is eliminated.

Below are the ranges of particle size distribution covering Pure Red Iron Oxides and Barytes. Other pigment groups have similar distribution ranges.

Always use Williams' particle-size controlled colors and extenders—and be sure of uniformity in the properties essential to the proper pigmentation of your product.

% BY WT. BELOW INDICATES SIZE			
Micron Diameter	Pure Red Oxide Light	Pure Red Oxide Dark	Barytes Sparmite No. 1 Barytes
40	100	100	100
30	100	100	100
20	100	100	100
15	100	100	100
10	99.9	99.3	97.5
7.5	99.2	98.3	87.0
5	98.2	84.9	66.5
4	97.7	74.5	55.0
3	97.2	25.2	43.0
2	96.2	7.3	29.5
1	90.6	5.6	15.0
0.5	78.0	4.9	7.0

WILLIAMS
COLORS & PIGMENTS

Easton, Pa. • E. St. Louis, Ill.
Emeryville, Calif.

When inquiring check CP 3471
opposite last page

MATERIALS

with clay or other fillers, pigmented, and subsequently calendered or embossed. In commercial production, it's recommended that latex deposit be heated at 240°F for about three minutes in order to develop optimum uniform water resistance throughout the treated product. At room temperature and without heat, water resistance develops in a few days.

(Vult-S series latices are products of General Latex & Chemical Corp., Dept. CP, 666 Main St., Cambridge 39, Mass. . . or for more information check CP 3472 on form opposite last page.)

Offers an economical means of sequestering frisky ions in textile processing . . .

inactivates all iron in alkaline solution when calcium, magnesium are also present

Uses: As a sequestering agent for calcium and magnesium, along with the iron often encountered with these ions. It offers an inexpensive means of softening water and preventing iron stains in alkaline textile processing liquors, and in preventing precipitation of heavy metal ions in solutions of industrial cleaners and herbicide formulations.

Features: Sequestering agent effectively inactivates all traces of iron in an alkaline solution when calcium and magnesium ions are also present. It is stable indefinitely at the boil in alkaline, neutral, or acid solutions, resisting hydrolysis.

Description: Sequestering agent is a balanced mixture of the soluble salts of amino carboxylic acids. One milliliter of sequestering agent controls 171 mg of CaCO₃ by the Oxalate method at pH 9. The slightly viscous, clear liquid is pale amber in color and has these properties:

Active content (% min)	41
Combining weight of active ingredient	371
Sp gr (@ 25°C)	1.3-1.4
pH of 1% soln. (@ 25°C)	11.5-11.7

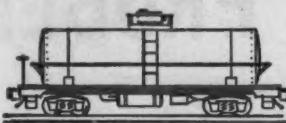
It is soluble in water in all proportions and has a slightly ammoniacal odor.

Water Softening Power of Agent

Hardness (gr/gal)	Fluid Ounces/100 gal to Completely Soften Water
1	1.3
5	6.5
10	13.0
15	19.5
20	26.0

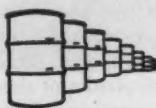
(Cheelox B-14 is a product of Antara Chemicals, a Div. of General Aniline & Film Corp., Dept. CP, 435 Hudson St., New York 14, N.Y. . . or for more information check CP 3473 on form opposite last page.)

FAST DELIVERY



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AND



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Du Pont LOROL®

Fatty Alcohols

Quick delivery can be made on "Lorol" fatty alcohols in tank cars and containers of various capacities and types. Your Polymers representative will be glad to discuss your specific requirements with you.

*Other types of containers used where appropriate



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DU PONT

LOROL®

Fatty Alcohols

CAN BE ESTERIFIED with acids in the presence of a catalyst.

CAN BE OXIDIZED to give the corresponding aldehydes. Further oxidation yields the acids.

CAN BE DEHYDRATED over an aluminum oxide catalyst to yield corresponding olefins.

ARE NON-CORROSIVE.

PRINCIPAL USES

These versatile straight-chain alcohols have wide application as chemical intermediates in the preparation of certain pharmaceutical, synthetic detergent and cosmetic products. "Lorol" fatty alcohols are also used as intermediates in the preparation of: lubricating oil additives; textile finishing, softening and anti-foam agents; polymerization modifiers used in synthetic rubber

manufacture; and plasticizers for plastics. They also find application in the leather and paper industries and have excellent possibilities for uses in other industries.

GENERAL ADVANTAGES

Du Pont "Lorol" fatty alcohols are closely controlled with respect to hydroxyl, iodine, acid and ester numbers and feature a high degree of uniformity.

AVAILABLE FOR IMMEDIATE SHIPMENT ARE:

"LOROL" 5 AND 7—mixtures made up principally of lauryl and myristyl alcohols.

"LOROL" 24—normal cetyl alcohol.

"LOROL" 28—normal stearyl alcohol. (In U. S. P. and Industrial Grades.)

To obtain full information on Du Pont "Lorol" fatty alcohols, just mail the coupon below, or write us on your letterhead today.

E. I. du Pont de Nemours & Co. (Inc.)
Polymers Dept. 582, Wilmington 98, Del.

Please send me full information on Du Pont "Lorol" Fatty Alcohols. I am particularly interested in using "Lorol" for the following applications:

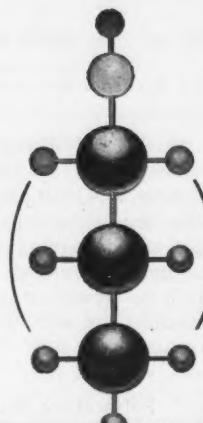
- Adipic Acid
- Crystal Urea
- Diglycolic Acid
- Hydroxyacetic Acid
- HYTROL® O Cyclohexanone
- HEXALIN® Cyclohexanol
- Methanol

Name _____ Position _____

Firm _____

Address _____

City _____ State _____



When inquiring check CP 3474 opposite last page

MATERIALS

**Thickens natural latex,
adds no odor or color
to paint formulations . . .**

viscosities are very stable over long periods

Uses: As a thickener for use with paint latices and resin emulsions.

Features: Exceptional thickening effect is given on natural latex, Buna N rubbers, butadiene-styrene, GR-S latex, and most polyvinyl acetate and other synthetic resin emulsions. No undesirable odor or color are introduced into compounded products and no syneresis nor coagulations are caused. There is no separation, and approximately neutral pH permits use with sensitive emulsions. Viscosities are unusually stable over long periods of time.

Description: Polyacrylate thickener is also used as a protective colloid and stabilizer.

(Polyco 296-W is product of Polyco Dept., Chemical Division, The Borden Company, Dept. CP, Peabody, Mass. . . or for more information check CP 3475 on form opposite last page.)

**Overcomes fatty-type odors
present in tall oil . . .**

reodorant is effective at 1% concentration

Uses: In direct processing of crude tall oil, allowing it to be used in preparation of sanitary, textile, and specialty soaps.

Features: Reodorant overcomes fatty-type odors present in tall oil. It provides odor control throughout the processing cycles.

Description: Industrial reodorant is very effective at concentration of 1%.

(Alamask TAL is a product of Rhodia, Inc., Dept. CP, 230 Park Ave., New York 17, N.Y. . . or for more information check CP 3476 on form opposite last page.)

**Two color tint groups
for surface coatings**

Color matching suggestions in formulating decorator finishes are given in five-page mimeographed bulletin. Complete tint base formulas used by manufacturer's laboratory are included.

"Blending Suggestions Bul. No. 4" is issued by Hilton-Davis Chemical Co., Div. of Sterling Drug Co., Dept. CP, 2235 Langdon Farm Rd., Cincinnati 13, Ohio. When inquiring check CP 3477 on the convenient form which is located opposite last page.

PRODUCTION PROBLEMS? COST PROBLEMS?

Armour cationics solved both in these two widely diverse fields. New applications are constantly being developed and added to the hundreds already known.

Perhaps these unique chemicals can help you.

It will benefit you to include Armour cationics in your testing program whether your business is rubber processing, mineral recovery, paper manufacturing, petroleum refining or whether you make germicides, paints, plastics or almost any item at all. Extremely low concentrations of these highly active chemicals are increasing efficiency and profits for industries in at least a thousand different ways. Today,

there are more than 100 different Armour cationics. One of them may be the chemical you've been looking for.

Let Armour cationics specialists help speed your search. The two examples shown here are typical of the 1000 and more successful applications for Armour cationics. Our research people will recommend cationics which have delivered similar outstanding results in your field.

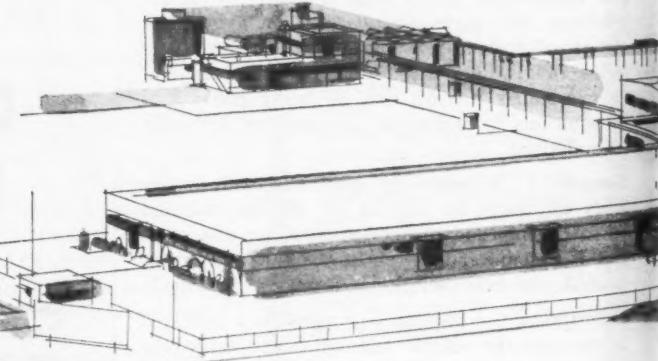
ARMOUR—world's largest producer of cationic chemicals



Armour cationics reduce water flood corrosion up to 99.5% and give complete control of bacteria—for as low as 0.7 mill per barrel of water

In secondary oil recovery, water is injected into the formations to force out the oil. Corrosion products—bacteria, and algae—often plug up water injection wells. As a result, less water can be injected and less oil is recovered. Now, engineers from over 124 water flood systems in eight states report that Armour cationics, such as the Arquads®, Armac®C and Duomeen®C give up to 99.5% corrosion protection. Concentrations as low as 6 ppm. also achieve complete control of algae and bacteria. Costs run from 0.7 to 2.1 mills per barrel of water. No expensive equipment needed!

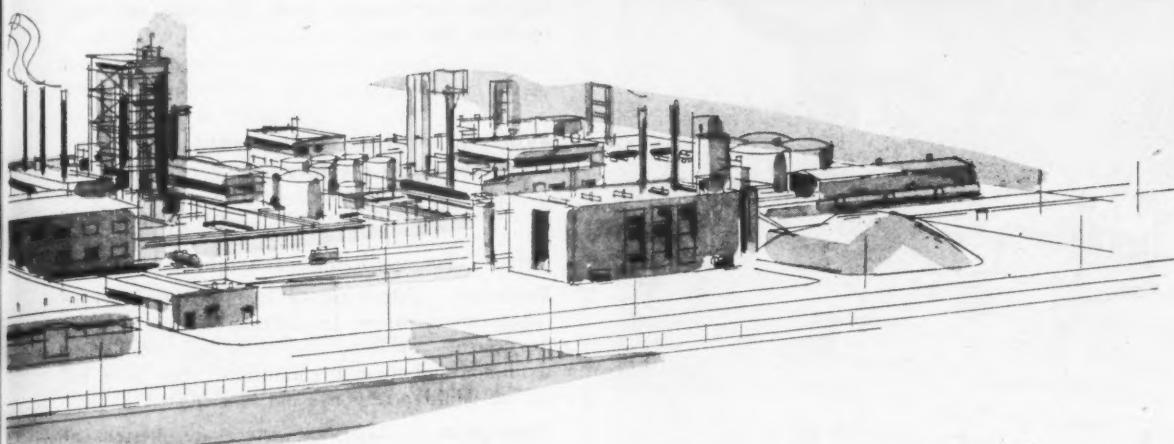
Armour makes over 100 cationics. Corrosion and bacteria control are only two of over 1000 applications. Effective at low concentrations, they are increasing production and profits for a broad range of American industries.



Storage and field tests prove Armour herbicide emulsifiers give stability and flash dispersion—for as little as 7¢ per gallon of concentrate

An effective emulsifier for herbicides must impart high stability during storage of the emulsifiable concentrate. After more than 1½ years of warehouse storage, concentrates containing Armour emulsifiers show no sign of separation or loss of emulsifying properties. Emulsifiability and stability are equally excellent with both soft and hard waters. And when added to water these concentrates give *flash dispersion!* Herbicides prepared with Armour cationics can also be diluted with fuel oil without the formation of sludge. And as little as 2% of an Armour emulsifier is required, compared with 5% for other emulsifiers. Armour cationics cut emulsifier costs to as low as 7¢ per gallon of concentrate!

Whether you are looking for a low cost herbicide emulsifier or working on cost reduction in some other application, you may very well find the answer in Armour's wide range of cationic chemicals. They are reducing costs in more than 1000 known applications.



This brief list of proved applications will suggest many areas where testing of Armour cationics may prove profitable for you.

Anti-statics • Emulsifiers • Asphalt Additives
 Textile Softeners • Corrosion inhibitors in water systems
 Corrosion inhibitors in oil systems • Pigment wetting
 Bactericides • Hard rubber mold release agents
 Algaecides • Buffing compound additives
 Vinyl mold release agents • Latex foam sensitizers
 Flotation reagents • Nitrile rubber plasticizers and softeners

For information on any of the hundreds of proved uses for Armour cationics—and for current data on possible new areas of application—fill in the coupon at the right.

MAIL THIS COUPON TODAY!

Please send me information on Armour cationics for the following applications:

Name _____

Firm _____

Address _____

City _____ State _____

 **ARMOUR CHEMICAL DIVISION**
 ©Armour and Company
 1355 West 31st Street, Chicago 9, Illinois
 CP2

Develops sensitive reagent for determination of thorium . . .

works even in presence of low concentrations of uranium and rare earths

Uses: As a very sensitive reagent for the determination of microgram quantities of thorium either gravimetrically or spectrophotometrically.

Features: Thorium may be determined in presence of uranium and the rare earth metals, provided that the concentration of these elements does not exceed 1000 micrograms.

Description: Reagent is the disodium salt of a sulfonated naphthol derivative.

(Thoron is a product of Jasonols Chemical Corporation, Dept. CP, 825 East 42nd St., Brooklyn 10, N.Y. . . . or for more information check CP 3479 on form opposite last page.)

Biological bases for cosmetics

Dehydag fatty alcohols and fatty alcohol derivatives are covered in 20-page, digest-size bulletin. Besides describing the specifications, composition, appearance, and properties of these products, their applications for the preparation of cosmetic creams and emulsions are given.

"Biological Bases for the Preparation of Cosmetics" is issued by Faltek Products Co., Inc., Dept. CP, 165 Broadway, New York 6, N.Y. When inquiring specify CP 3480 on form opposite last page.



When inquiring check CP 3478 opposite last page



Mother's big helper is "soap"

Have you ever stopped to count how many different types of soaps and detergents you have in your house at one time? Today, "soap" is a specialist. Its new and improved properties, benefiting home and industry alike, are significant examples of applied chemical research.

Fast-moving soap makers depend on their lines of chemical supply. Sudden new chemical needs are as normal as doubling the use of a standard raw material. To anticipate and provide for these diverse requirements, Olin Mathieson offers a unique program of *coordinated planning and production*. This assures soap makers of the availability of chemical raw materials

regardless of changing market conditions, development of new products, or requirements for plant expansions.

Right now, a growing number of chemical consumers are coordinating their planning and production with Olin Mathieson... America's prime producer of basic industrial chemicals. Olin Mathieson's long experience and familiarity with the broad market picture can prove invaluable in *your* planning. Why not consult with us... now?

3436

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.



INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Soda • Hydrazine and Derivatives • Hypochlorite Products • Chlorine • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid
ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylether • Formaldehyde • Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorophenol • Trichlorobenzene

When inquiring check CP 3481 opposite last page

MATERIALS

Sees applications in cationic surface-active agents, resin intermediates . . .

product undergoes reactions of primary and secondary amine groups

Uses: Of interest as a chemical intermediate. Compound may be used to make cationic surface-active agents and resin intermediates. It may also have application in production of dyestuffs, textile finishing compounds, insecticides, and oil additives.

Features: Product undergoes reactions involving primary and secondary amine groups.

Description: N-(2-Hydroxypropyl) ethylenediamine is a clear liquid trade-named Monolene.

(Monolene is available in pilot-scale quantities from Michigan Alkali Div., Wyandotte Chemicals Corp., Dept. CP, Wyandotte, Mich. . . . or for more information check CP 3482 on form opposite last page.)

Synthetic lubricant applications for azelaic acid diesters . . .

have high quality, are priced competitively

Uses: For applications as synthetic lubricants.

Features: Esters are of high quality and are competitively priced. In addition to high VI, they have stable low-temp viscosities and stability to oxidation and thermal conditions. They have excellent additive response and lubricity.

Description: Lubricant esters are diesters of azelaic acid. Emolein 2957 is the iso-octyl ester and 2958, the di-2-ethylhexyl ester.

(Lubricant esters are products of Emery Industries, Inc., Dept. CP, Carew Tower, Cincinnati, Ohio . . . when inquiring specify CP 3483 on form opposite last page.)

Gives properties, uses of a versatile alcohol

A primary, monohydric, high-mw alcohol that's used in alkyd resins, adhesives, fixatives, hot-melt coatings, oil additives, wax additives, and surface-active agents is detailed in 16-page technical booklet. Its uses in alkyd resin design, in oil-modified alkyd resins, and in oil-free alkyl resins are played up. Chemical and physical descriptions are included also.

"Abitol" is issued by Synthetic Dept., Hercules Powder Co., Inc., Dept. CP, 900 Market St., Wilmington 99, Del. When inquiring check CP 3484 on form opposite last page.

MATERIALS

Makes polyurethane foams . . .

emulsifier-coupler gives a low-odor foam

Uses: As an emulsifier-coupler for making flexible polyurethane foams.

Features: The foams have no detectable odor, and tests show that they remain odor-free after prolonged heating, simulating long periods of actual use.

Description: A blend of nonionic and anionic surface-active agents, product is used in proportions of about 1-2½%, based on total weight of all reactants. Physical properties include:

pH (of 3% aq dispersion)	3.4
Acid no.	12-16
Sp gr	1.00-1.02
Moisture (max %)	0.3

The free flowing liquid is amber in color, solidifies below 55°F. It is soluble in alcohols, aromatic and chlorinated solvents, and polyesters used in making polyurethane foams. Dispersible in water, it is insoluble in kerosene.

(Witco 77-86 is a product of Witco Chemical Co., Dept. CP, 122 E. 42nd St., New York 17, N.Y. . . or for more information check CP 3485 on form opposite last page.)

Shows that n-octyl-tin compounds are good stabilizers for PVC and have low toxicity

Knowing that toxicity in the dialkyl-tin compounds is confined mainly to the lower ($< C_4$) alkyl groups, the Institute for Organic Chemistry T.N.O., Utrecht, Union of South Africa, is investigating suitability of the higher dialkyl-tin compounds as stabilizers for halogen-containing polymers such as polyvinyl chloride. They've found that the di-n-octyl-tin maleate and laurate (both made by simple methods) have a stabilizing action which is of the same order of magnitude as the corresponding butyl-tin compounds.

(Information supplied by Tin Research Institute, Inc., Dept. CP, 492 W. Sixth Ave., Columbus 1, Ohio . . . or for more information check CP 3486 on form opposite last page.)

Silicone reference guide

Almost 150 silicone products (fluids, compounds, greases, resins, and rubbers) are described in 12-page "1956 Reference Guide" issued by Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. When inquiring check CP 3487 on form opposite last page.

THE SWITCH IS TO...
DAVISON SILICA GEL
FOR DRYING NATURAL GAS

Actual use tests have proven to many that Davison Silica Gel is the efficient, economical way to dry natural gas. Davison Silica Gel gives you a high capacity for moisture even at elevated temperatures (110-120°F.). It is economical to use because it requires fewer reactivations and gives longer life due to its resistance to fouling and attrition. Davison Silica Gel dries a wide variety of gas feeds to extremely low dew points. It is one of the most efficient adsorbents known for hydrocarbon recovery.

Investigate Davison Silica Gel for drying natural gas. Your Davison Field Service Engineer will be glad to give you all the details or write for complete technical data on drying of natural gas contained in Davison Bulletin No. 201.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Sales Offices: Baltimore, Md. • Chicago, Ill. • Columbus, Ohio • Houston, Texas • New York, N.Y.
Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole producers of DAVCO® Granulated Fertilizers.

When inquiring check CP 3488 opposite last page

Available for use only

NEW LAURYL ALCOHOLS

COLOR STABILITY

WATER WHITE

50% TO 90%

PURE C₁₂



Aerial view of ADM's new fatty
alcohol plant in Ashtabula, Ohio.



Hydrogenated and Distilled Fatty Acids and Stearic Acid . . . Hydrogenated Vegetable, Fish, Sperm Oil and Tallow . . . Hydrogenated Castor Oil . . . Stearyl, Cetyl, Oleyl Alcohol . . . Sperm Oils and Spermaceti . . . Behenic Acid . . . Erucic Acid . . . Hydroxystearic Acid.

Chemifats
that put **SELL**
into your
products



Archer-Daniels-Midland company

CHEMICAL PRODUCTS DIVISION
2191 WEST 110th STREET • CLEVELAND 2, OHIO

When inquiring specify CP 3489 opposite last page

MATERIALS

**Designs pigment dispersions
to give uniform line
of color pastes . . .**

may be used in wide range of concentrations in latex paint and not unbalance properties

Uses: As pigment dispersions for latex paint.

Features: Dispersions were developed to: 1—Eliminate necessity of adjusting basic latex paint formulations to accommodate various dry pigments which are divergent in inherent surface and dispersion characteristics; 2—Give a complete line of products which are uniform, one to another, so they may be admixed to produce a great variety of shades and hues. Dispersions have excellent compatibility with a wide variety of latex paint formulations.

As a result, they may be used in combination in any proportions and in a wide range of concentrations with the base paint without upsetting balance of properties. Even though they are stable themselves and maintain good stability in liquid paint, their compatibility with latex emulsions facilitates transfer to resinous film-forming phase as film dries and coalescence takes place. Pigment dispersions have storage stability and are not damaged by repeated freezing and thawing nor by exposure to moderate heat.

Description: Pigment dispersions have high color concentration. Seven dispersions are available: yellow, scarlet, red, two greens, and two blues. Solids content ranges from 35 to 40%. pH values range from 8.9 to 9.9, with Stormer consistency (KU) range from 66 to 98, depending upon the color. Specific gravities are in the 1.10-1.16 range. All pigments are considered acceptable in light fastness for interior architectural use. The pigment dispersions are stabilized with an alkali-solubilized protective colloid.

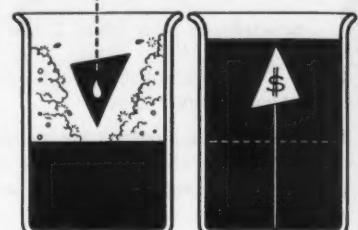
(Accosperse pigment dispersions are products of Pigments Div., American Cyanamid Co., Dept. CP, 30 Rockefeller Plaza, New York 20, N.Y. . . or for more information check CP 3490 on form opposite last page.)

Gathers Information on versatile polyamide resin series

Eight versatile polyamide resins for coatings, adhesives, varnishes, and plastics are covered in 16-page pocket-size pamphlet. Resins are tough, amber polymers made by condensation of dimerized and trimerized unsaturated fatty acids of vegetable oils with ethylene diamine.

"Versamids" is issued by Chemical Division, General Mills, Inc., Dept. CP, PO Box 191, Kankakee, Ill. When inquiring check CP 3491 on form opposite last page.

DOWN goes foam



**UP goes production
with Dow Corning
Silicone Defoamers**

Dow Corning Antifoam A* Compound and Antifoam A emulsions are the most efficient and versatile foam killers ever developed. Thousands of successful applications prove they increase productive capacity, reduce processing time, eliminate the waste and fire hazard of boil-overs. And all three, Antifoam A Compound¹—Antifoam A Emulsion—Antifoam AF Emulsion², are effective at low concentrations. For example:

One Ounce of

... Antifoam A Compound kills foam in
6 35,000 lb
Vitamin B₂

... Antifoam A Emulsion kills foam in
6 1,245 lb
textile sizing

... Antifoam AF Emulsion kills foam in
6 2,075 lb
chocolate syrup

¹ Permissible in food processing at concentrations up to 10 ppm.

² Permissible in food processing at concentrations up to 32 ppm.

free sample

Test these versatile silicone defoamers at our expense.

SEND COUPON TODAY!

DOW CORNING SILICONES		Dow Corning Corporation Midland, Mich., Dept. 3202
Please send me:		
<input type="checkbox"/> Booklet on Silicone Defoamers; FREE <input type="checkbox"/> sample of <input type="checkbox"/> Antifoam A Compound <input type="checkbox"/> Antifoam A or <input type="checkbox"/> AF Emulsion;		
NAME _____		
COMPANY _____		
ADDRESS _____		
CITY _____		ZONE _____ STATE _____
© T M DOW CORNING		

When inquiring check CP 3492
opposite last page

CHEMICAL PROCESSING

MATERIALS

**Made from domestic sources,
synthetic mica should extend
temp operating ranges . . .**

many of its properties can be controlled in manufacture

Uses: Electrical and thermal insulation material.

Features: Mica can be tailor-made, as many of its properties can be controlled in manufacture. In addition to being based on domestically-available raw materials, the synthetic product can be used in some applications where natural mica is ineffective. For example, at high temperatures.

Description: Although first made in the 1880's, commercially-available synthetic mica is a recent development. Using an electric melting and a crystallizing process, crystals as large as 2 x 2" have been made. The bulk of the mica produced, however, is in the form of small flakes and micro-crystals. These are further processed and are available as the ceramoplastic (mica bonded with glass), reconstituted sheet, and hot-pressed blocks.

Chemically, the synthetic mica is a member of the fluor-phlogopite family. The composition is similar to the naturally-occurring phlogopite mica, but fluorine is substituted for the hydroxyl radical. The resulting material is much more resistant to high temperature, since the breakdown of hydroxyl groups in natural mica is the chief cause of swelling, bloating, and exfoliation.

(Synthamica is a product of Synthetic Mica Corp., a Sub. of Mycalex Corp. of America, Dept. CP, PO Box 311, Clifton, N.J. . . or for more information check CP 3493 on form opp. last page.)

Permanent plasticizer for vinyls: di-isodecyl phthalate

Uses: As a primary plasticizer in vinyl compounds.

Features: This permanent plasticizer gives superior performance in vinyl compounds. It is less volatile than other widely-used plasticizers, and has better aging and low-temp properties.

Description: Di-isodecyl phthalate has these specs:

Sp gr (20°/20°C)	0.966
Moisture (max %)	0.1
Color (APHA Pt-Co, max)	100
Odor	characteristic
Acidity (as acetic acid, % max)	0.01

(Di-isodecyl phthalate is a product of Ohio-Apex Div., Food Machinery & Chemical Corp., Dept. CP, Nitro, W. Va. . . or for more information check CP 3494 on form opposite last page.)

PETRONATE

(Reg. U. S. Pat. Office)

... the oil-soluble petroleum sulfonate for all four major functions . . .

A Emulsification and Dispersion of Liquids

B Dispersion and Wetting of Solids

C Wetting and Dispersion of Liquid-Solid Systems

D Inhibition of Rust and Corrosion

PETRONATE is the general trade name given by Sonneborn to its various types and grades of oil-soluble petroleum sulfonates.

The chart suggests the broad range of uses for this material. A laboratory sample of PETRONATE will

help you determine how its many advantages can be put to efficient use in your manufacturing processes.

Check the coupon below indicating the use intended so that we can send you the proper type of PETRONATE.

USES OF PETRONATE

APPLICATION	PRIMARY FUNCTION OF PETRONATE	SECONDARY FUNCTION
EMULSIFICATION AND DISPERSION OF LIQUIDS		
1. Insecticide Emulsions	Emulsifying Agent for Toxicant	Spreading Agent
2. Textile Oils	Emulsifying Agent for Textile Processing Oils	Wetting and Dispersing Agent for Textile Fibers
3. Leather Oils	Emulsifying Agent for Leather Processing Oils	Wetting and Dispersing Agent for Leathers
DISPERSION AND WETTING OF SOLIDS		
4. Rubber Manufacture	Thermo Plasticizing Agent	Increases Dispersability of Filler
5. Fuel Oil	Keeps Sludge in Suspension	Prevents Segregation of Moisture
6. Printing Ink Manufacture	Aids dispersion of pigment	Reduces Viscosity of Ink
7. Ore Flotation	Flotation Reagent	Selective Wetting Agent
8. Additives for Lube Oil	Acts as Detergent	Inhibits Bearing Corrosion
WETTING AND DISPERSION OF LIQUID-SOLID SYSTEMS		
9. Crude Oil Emulsion Splitting	Reverting Agent for Water-in-Oil Emulsions	Aids in Wetting out Salts and Solids
10. Emulsifiable Solvent Cleaners	Dispersing Agent for Oil and Grease Deposits	Acts as Emulsifying Agent
11. Dry Cleaning Compounds	Linking agent for Water and Solvent	Loosens Dirt Absorbed by Fabric
12. Fat Splitting Process	Dispersing Agent for Solid Fats	Acts as Wetting Agent
INHIBITION OF RUST AND CORROSION		
13. Corrosion Preventive Compounds	Rust and Corrosion Inhibiting Agent	Acts as Moisture Barrier
14. Anti-Freeze Solutions	Rust and Corrosion Inhibiting Agent	Aids in Dispersion of Scale
15. Soluble Cutting Oils	Emulsifying Agent for Mineral Oil	Rust Inhibitor

L. SONNEBORN SONS, INC.

New York 10, N. Y.

White Oil and Petrolatum Division, L. SONNEBORN SONS, INC.
300 Fourth Avenue, New York 10, N. Y.

Please send sample of PETRONATE suitable for use indicated below (circle number corresponding to use in chart above).

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

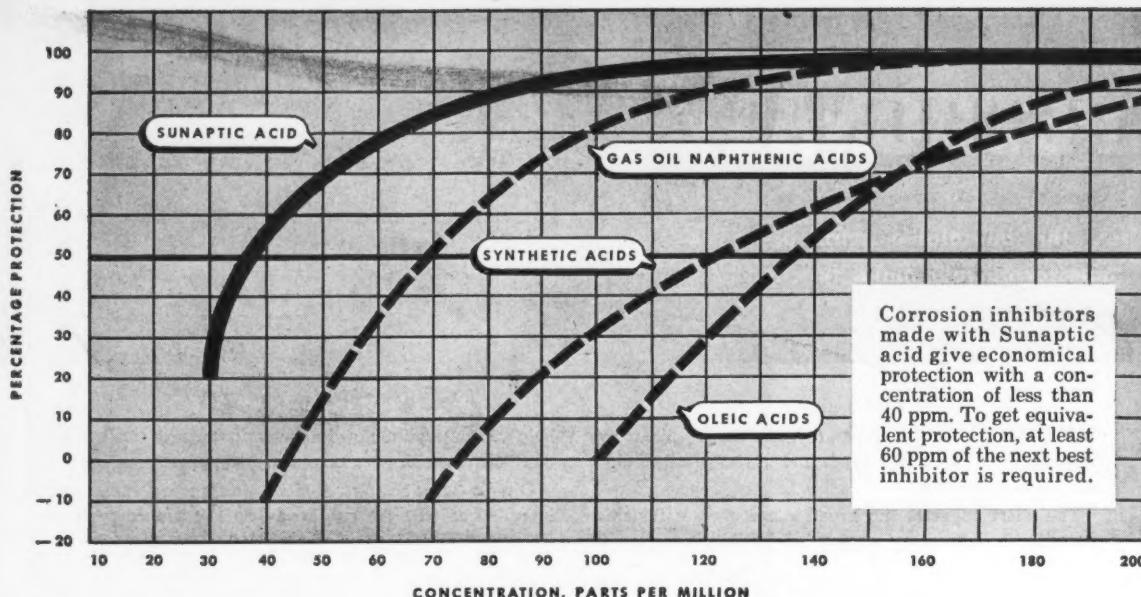
Name _____

Company _____

Address _____

City _____ P.O. Zone _____ State _____

When inquiring check CP 3495 opposite last page



UNIQUE SUNOCO PETROCHEMICAL INCREASES EFFICIENCY OF CORROSION INHIBITOR OVER 50%

**High-molecular-weight Sunaptic acids
replace fatty, naphthenic and synthetic acids**

Corrosion of tubing and casing in oil wells and in crude oil pipelines is a major problem that can be minimized by corrosion inhibitors. Several promising corrosion inhibitors combine tallow diamine with fatty, naphthenic or synthetic acids. The results of tests with these inhibitors were considered excellent until an inhibitor containing Sunaptic acid was tested. The Sunaptic acid inhibitor, which costs about the same per gallon, proved to be 50% more efficient than the next best inhibitor. This increased efficiency can save thousands of dollars a year in one oil field alone.

If you are making a product with fatty, rosin, synthetic, or ordinary naphthenic acids, there's a good chance Sunaptic acids can help you improve your product. These unique high-molecular-weight acids have many unusual properties: no olefinic unsaturation, high resistance to oxidative rancidity, low freezing or pour points, and a higher hydrocarbon solubility than ordinary fatty and rosin acids.

Sun Oil Company has two Technical Bulletins de-

scribing both the properties of Sunaptic acids and many possible uses for them. To get copies of these Bulletins, see your Sun representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. CP-2.

Sun Oil Company produces many other petrochemicals. These include:

**BENZENE, TOLUENE, MIXED XYLEMES
PROPYLENE TRIMER AND TETRAMER
SULFONATE WS (water soluble sulfonates)
PDO-40 (polymerized drying oil)**

The list of Sunoco Petrochemicals is growing rapidly... several new Sunoco Petrochemicals will be introduced shortly. If you have a problem that may be solved by a new type of petrochemical, we'll be glad to discuss it with you.

MATERIALS

**Three resins comprise series
for pre-mix molding . . .**

designed for rapid forming of intricate parts. Uses: These resins are pre-mixed by molder in large batches, with filler pigment and reinforcing materials. Mixture is molded in matched metal dies using conventional compression molding presses.

Features: Resins are designed for rapid molding of intricate parts with varying wall thicknesses, difficult contours, and molded-in inserts. Intricate parts can be produced at lower costs.

Description: Polyester resins each have their own characteristics. Resin PE-40 is a rigid resin containing diallyl phthalate. Fast cure cycles can be used, and products have good surface characteristics. It has high flex strength, modulus of elasticity, and hot strength.

Resin PE-51 is a resilient, high-viscosity resin containing diallyl phthalate. It has flexibility and minimizes cracking around core pins and inserts.

PE-55 is a resilient resin containing vinyltoluene. It has medium viscosity and a lower price. Typical properties of pre-mix compounds are:

	PE-40	PE-51	PE-55
Hot Barcol hardness (30 sec after cure)	38	8	13
Ultimate flex strength (psi at room temp)	17,900	15,900	16,900
Modulus of elasticity in flexure (10 ⁶ psi at room temp)	1.6	1.56	1.54
Ultimate tensile strength (psi)	—	3400	6120
Water absorption (% after 24 hr)	0.36	0.19	0.149
Shelf life of mix (days @ 73°F)	7	7	8

(Plaskon polyester resins are products of Plastics & Resins Sales Dept., Barrett Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. . . or for more information check CP 3497 on form opposite last page.)

**Properties of aluminum pigments
for surface coating formulations**

Eight aluminum leafing pastes, three leafing powders, and four non-leafing pastes are presented in informative 15-page notebook. Manufacturer's series of aluminum pigments is made from foil of highest commercial purity, averaging 99.5%, and yield flakier aluminum flakes.

"Product Information on Aluminum Pigments" is issued by Silberline Manufacturing Co., Inc., Dept. CP, Stamford, Conn. When inquiring check CP 3498 on form opposite last page.



When inquiring check CP 3496 opposite last page

U.S.I. CHEMICAL NEWS

Jan.-Feb.

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★ 1956

Phosphoric Acid Plant Planned by U.S.I.

Plans to build a new plant at Tuscola, Illinois to produce wet-process phosphoric acid have been announced by U.S.I.

Annual production capacity will be 60,000 tons of 75% phosphoric acid, produced from sulfuric acid and phosphate rock by a process developed by the S. A. Metallurgique de Prayon, a Belgian company. Singmaster and Breyer will engineer and construct the plant, which is expected to start operating at the end of 1956.

U.S.I. already produces sulfuric acid, ammonia and nitrogen solutions at Tuscola. The addition of phosphoric acid to this range of fertilizer raw materials will substantially expand the scope of U.S.I.'s service to fertilizer manufacturers in the mid-west farm belt.

U.S.I. Changes to 55 Gallon Drum Filling

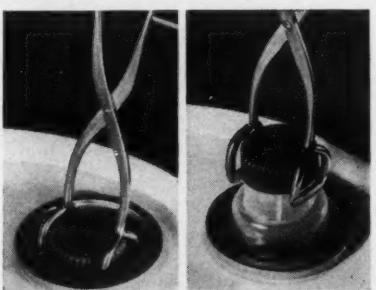
As of January 1 U.S.I. is using a new drum for shipment of SOLOX® Proprietary Solvent Alcohol and a number of other solvents. This new standard drum is gradually being adopted by most suppliers, and will eventually become standard for all U.S.I. products. Net capacity is 55 gallons—the older one contained 54.

Because of the stocks of filled drums maintained in U.S.I. warehouses for customer convenience, 54 gallon drums will be shipped until inventory is depleted.

New Folder Aids U.S.I. Alcohol Users

Five-gallon drums of U.S.I. ethyl alcohol, USP come equipped with the FlexSpout® closure, a leakproof, tamperproof polyethylene spout which offers alcohol users greater convenience in handling and pouring. Five-gallon drums of SOLOX®, U.S.I.'s proprietary denatured alcohol solvent, and many other U.S.I. chemicals and solvents are also equipped with this closure.

An illustrated folder now available from U.S.I. describes the closure and shows how it can best be opened. Although mentioned only briefly in the folder, some users have discovered that a pair of ordinary kitchen tongs, the kind normally used for handling baby bottles, also makes an excellent opener for the FlexSpout. The technique is illustrated below.



*@Rieke Metal Products, Auburn, Ind.

WORLD'S FIRST COMMERCIAL ISOSEBACIC ACID PLANT PLANNED BY U.S.I. FOR 1957

New Intermediate Shows Promise In Plastics Industry For Plasticizing And Other Functions

The first commercial plant in the world for the production of isomers of sebacy acid, known as "U.S.I. Isosebatic" acid, will be built at Tuscola, Illinois. Initial production capacity of the plant will be 10 million pounds per year and completion of the plant is scheduled for early in 1957. Catalytic Construction

Company of Philadelphia, will be engineers and contractors for the project.

"U.S.I. Isosebatic" acid is a mixture of isomers of sebacy acid in approximately the following proportions:

2-ethylsebacy acid	72-80%
2,5-diethyladipic acid	12-18%
Sebacy acid	6-10%

This new product is the result of more than three years of research which began under the auspices of a National Distillers' fellowship at the University of Cincinnati and progressed through the company's research laboratory. For the last two years, "U.S.I. Isosebatic" acid has been in pilot plant production, first at U.S.I.'s former Fairfield plant and more recently in the company's new pilot plant facilities at the Cincinnati Research Laboratory.

The Cincinnati pilot plant will continue to operate to supply samples and to develop further process refinements until the Tuscola plant comes on stream.

Over 400 research laboratories already have received samples of "U.S.I. Isosebatic" acid for evaluation. The product shows considerable promise as a raw material for vinyl resin plasticizers with excellent low-volatility, non-migration, and low-temperature characteristics.

Other promising applications include: the production of polyamide (nylon type) mold-

MORE



"U.S.I. Isosebatic" acid goes into plasticizers for vinyl resins, which are used to make items such as the plastic curtains shown here.

Jan.-Feb. *

1956

U.S.I. CHEMICAL NEWS

CONTINUED

Isosebacic

ing and extrusion plastics and adhesives; alkyd resin manufacture, to impart flexibility and water resistance to the surface coating film; the synthesis of ester lubricants of the type used in jet propelled aircraft; the production of polyester resins used in the manufacture of glass reinforced plastics; the synthesis of polyurethane resins for foamed plastics, synthetic rubber and protective coatings.

This new chemical is produced by a novel process for which the principal raw materials are butadiene, a petrochemical, and sodium, of which U.S.I. is an important producer. Tuscola was chosen as the location for the new plant because of the availability of raw materials at this site—hydrocarbons from National Petro-Chemicals Corporation as well as sulfuric acid and other raw materials from the adjacent U.S.I. installation.

Electrical Grades, U.S.I. Polyethylene, Introduced

The PETROTHENE® 300 series of electrical grade polyethylene resins has just been introduced to meet the variety of electrical specifications for infantry field wire, line wire covering, TV lead-in wire, high frequency and high voltage insulation and, in general, all wire and cable insulating and jacketing applications.

Melt indexes for the uncompounded grades are as follows:

PETROTHENE 300—0.3
PETROTHENE 301—1.0
PETROTHENE 302—2.8

Each of these types is also supplied compounded with antioxidant, with antioxidant and carbon black, with non-discoloring antioxidant, and with non-discoloring antioxidant and carbon black, as well as with other colors.

PETROTHENE 300 and 301, uncompounded materials, can also be used for other applications requiring very high molecular weight material, and requiring high toughness and resistance to environmental stress cracking. Blow molded bottles and closures that are exposed to solvent type detergents, cosmetics, etc., are possible applications.

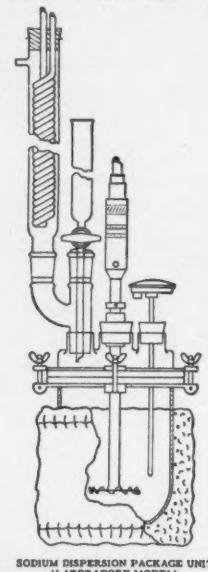
CONTINUED

Sodium

coupling to high speed motor.

The laboratory procedure for preparing dispersed sodium is described in the U.S.I. brochure "Sodium Dispersions". Sodium, dispersing medium and dispersing aid are charged into flask and heated to 110-120°C and whole system kept under dry nitrogen atmosphere. Baffling is not required. Once temperature is above the melting point of sodium, the motor is started and allowed to reach 4000-5000 rpm. range. Particle size of 2-20 microns (checked with a microscope with a calibrated eyepiece) is obtained in 6-8 minutes.

No loss in dispersing efficiency has been observed in scaling up from laboratory to pilot plant. For example, preparation of 3-4 gallons of sodium dispersion in 5-gallon vessel with 6" "Dissolver" may be accomplished in 10-20 minutes. Sodium particle size averages 6-8 microns with maximum of 15 microns.

SODIUM DISPERSION PACKAGE UNIT
(LABORATORY MODEL)

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Temporary window closures of polyethylene film are being used on construction jobs, permitting work to continue in bad weather. Film has blocked winds up to 65 miles per hour, holds in heat, admits daylight. **No. 1130**

Film badges for detecting radiation are now available to insure personnel protection in x-ray and radioisotope labs, industrial plants doing gamma radiography, and doctor's and dentist's offices. Badges read from .05 to 300 r. **No. 1131**

New refined liquid lanolin has high solubility, stability, versatility in drugs and cosmetics. Amber-colored oil is result of 11-step refining process. Properties same as lanolin except non-tacky, lower melting point. **No. 1132**

Polyethylene gas scrubber, recently developed, resists chemical attack at temperatures up to 170°F. Will be used with hydrofluoric acid and fluorides. Designed for gas flow of 2500 cu. ft./min. at 1½ psi. **No. 1133**

New volatile solvent concentrate acts as strong synergist with low-cost solvents, boosting dissolving power and drying performance. Does not burn, imparts fire extinguishing properties, has relatively low toxicity. **No. 1134**

To hold temperatures close to Absolute Zero, new type refrigerator has been developed based on cyclic principle of magnetic cooling. No moving parts or flowing fluids. First apparatus to both produce and maintain extreme cold over long periods. **No. 1135**

Colored aluminum for architectural use now made possible by treating anodized aluminum with new lightfast organic dyes. The colored anodic films are part of metal surface itself—will not peel, chip or scale. **No. 1136**

Succinic acid, organic polybasic acid, now available commercially for formulation of plasticizers, polyesters, alkyd resins, paints, drugs, cosmetics, chemical intermediates. **No. 1137**

Paper made wholly from nylon fiber, produced commercially for first time, is many times stronger than conventional types. Resists action of chemicals, mold, bacteria, light. Absorbs little moisture. **No. 1138**

Aqueous calcium stearate dispersion has been developed to improve coating formulations for machine coated papers. Product improves gloss, effective plasticizing, water repellency; provides lubrication, non-dusting, good flow. **No. 1139**

PRODUCTS OF U.S.I.

AGRICULTURAL CHEMICALS:

Ammonia, Anhydrous—Commercial and refrigeration grades in tank cars or tank wagons.

Nitrogen Fertilizer Solutions—Aqueous solutions of ammonium nitrate and ammonia in all standard analyses.

Sulfuric Acid—All strengths from 60° Baumé to 40% Oleum. Also Electrolyte grade meeting Federal Specifications. Tank cars or tank wagons.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins.

Inorganic Chemicals: Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetylides, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalate, Sodium Ethylate solution, Urethan USP (Ethyl) Carbamate.

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curby B-G® 80, Special Liquid Curby®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B12 and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D₃ and K₃ products.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

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Division of National Distillers Products Corporation
99 Park Avenue, New York 16, N.Y.

Dyes for aluminum are suitable for outdoor application . . .

give color appeal to many aluminum products

Uses: For dyeing anodized aluminum products such as builders' hardware, interior automobile trim, outdoor furniture, sporting goods.

Features: If processed according to manufacturer's suggestions, color can be expected to last normal life of product in exterior applications. Dyes permit natural metallic beauty of aluminum to shine through.

Description: Five dyes are available at present time: brass color, yellow, black, and two blue colors. A number of elements will determine final durability of color: the thickness of the aluminum oxide coating, the amount of dye absorbed, and the method of sealing. In anodizing, period of 30 to 60 minutes is required, and dyeing takes about 30 minutes. A nickel acetate seal must be used after dyeing.

(Weather-fast colors for anodized aluminum are products of Sandoz Chemical Works, Inc., Dept. CP, 61-63 Van Dam St., New York 13, N.Y. . . . or check CP 3499 on form opposite last page.)

Reduced volatility, improved water-extraction resistance given by plasticizer . . .

imparts low-temp flex and light stability to vinyl products

Uses: As plasticizer for vinyl calendered film and sheeting, profile extrusions, dip coatings, slush moldings, and electrical insulation. It also finds use as a nitrocellulose plasticizer and as a softener for synthetic and natural rubber.

Features: Reduced volatility and improved resistance to water extraction are its outstanding features. In addition, it imparts excellent low-temperature flexibility and light stability to vinyls. It gives high viscosity stability to plastisols.

Description: Didecyl adipate plasticizer is produced in manufacturer's new Oxo unit at Texas City, Texas.

(Flexol 10-A is a product of Carbide and Carbon Chemicals Co., a div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check CP 3500 on form opposite last page.)

For more information on product at left, specify CP 3501 . . . see information request blank opposite last page.

BRIEFS

for buyers of



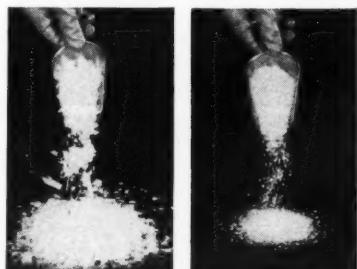
Caustic Soda Aluminum Chloride Sulfur Chlorides

He treats our caustic drums rough. A customer in the Pennsylvania oil fields made our salesman wince.

Said he likes our flake caustic soda drums, because they make it easy to distribute caustic in the field. He just shoves the drums off the tailgate of his truck, lets them bounce. He's been doing it for some time without handling losses.

We certainly don't advise this procedure, but it does provide a dramatic testimonial. Six lugs grip the lid of every drum of Hooker flake caustic soda—the best way we've found to keep the caustic dry and pure for your processing or repackaging.

The drum comes to you full of clean, uniform flakes—regular, fine, or crystal—or powdered caustic. The picture below demonstrates how dust-free the flakes are. The coupon offers a helpful booklet on buying caustic soda.

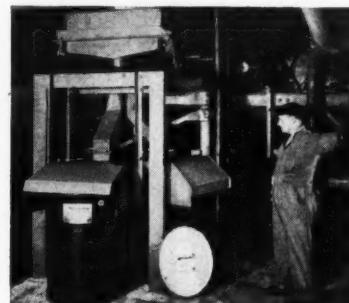


Why we air-condition our aluminum chloride. Even slightly humid air reacts swiftly with aluminum chloride. When it does, the crys-

tals of this sensitive chemical lose their shape, and most of their punch as catalysts.

We avoid such damage to our aluminum chloride by using a special packaging room that is air-conditioned. It gives us complete control over humidity. Regardless of outside weather conditions, we can package aluminum chloride all year 'round.

To you the room means a continuous, dependable supply of full-strength aluminum chloride. And you always get the size you want for your process.



Speaking of size, you have a choice of four from Hooker—extra fine, fine and coarse grinds, and coarse screened. Send the coupon for a data sheet that gives complete specifications on all four or write today on your business letterhead.

How to dry paint in 2 seconds. Many paints, inks, and varnishes take from 24 hours to a week to dry thoroughly.

But pass them through sulfur dichloride vapor, and they dry before

your eyes—in from 2 to 20 seconds. This drying process works on paper, wood, cloth, metal, glass, plastics.

Maybe there's a place for super-fast drying in your company. If you think so, write us for the name of the process licensor.

Perhaps you're already using SCl_2 in a less glamorous but equally useful way. Whatever the need, you can answer it by specifying Hooker sulfur dichloride.

And if it's chlorination you're doing, you might be happy to know we also make its versatile chemical cousins, sulfur monochloride, sulfuryl chloride, and thionyl chloride.

Sources we've checked indicate we're the only producers of all four of these chlorides. We'll be happy to provide (a) data sheets on any of them, if you'll check the coupon; (b) samples, if you'll just write on your letterhead outlining your needs.

Check items you'd like to receive:

- Caustic Soda Buyer's Guide** • A helpful pocket-size booklet full of information and pictures on forms and sizes; shipping methods and containers; the economics of 50% vs. 73% solutions (with nomograph to help decide which is your best buy); and technical service.

Keep your file up-to-date with technical data sheets on these Hooker chemicals:

- Aluminum chloride
- Caustic soda (standard grade)
- Caustic soda (rayon grade)
- Sulfur dichloride
- Sulfur monochloride
- Sulfuryl chloride
- Thionyl chloride

Clip and mail with your name, title, and address.

**HOOKER
CHEMICALS**

From the Salt of the Earth
HOOKER ELECTROCHEMICAL COMPANY
15 FORTY-SEVENTH STREET, NIAGARA FALLS, N.Y.
NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

When inquiring check CP 3502 opposite last page

MATERIALS

**Plasticizes synthetic rubbers,
gives easier and faster
processing . . .**

especially good where low-temperature performance is a requisite

Uses: For plasticizing synthetic rubbers, vinyls, celluloses, and other polymers. It is recommended for industrial and military applications for rubber-based extruded, molded, and calendered articles.

Features: It is particularly good where low-temperature performance is a requisite. Plasticizer gives easier and faster processing, and imparts lower heat loss, less water sensitivity, and lower compression set.

Description: Triethylene glycol dipelargonate is an ester-type plasticizer, with these properties:

Acid number (max)	1.0
Hydroxyl number (max)	15.0
Color (% transmission, 440m μ /550m μ , 2 1/2 cm cuvette, min)	30/90
Sp gr (@ 20°C)	0.965
Mw (average)	420
Flash point (°F)	410
Viscosity (SUS @ 100°F)	59
Pour point (°F)	<0

(Plastolein 9404 TGP plasticizer is a product of Dept. 5, Emery Industries, Inc., Dept. CP, Carew Tower, Cincinnati 2, Ohio . . . or for more information check CP 3503 on form opposite last page.)

**No catalysts, no hardeners needed
with series of one-component
epoxy resins . . .**

at high temperatures, resins become rubbery rather than brittle

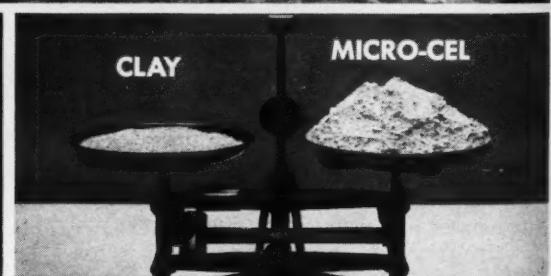
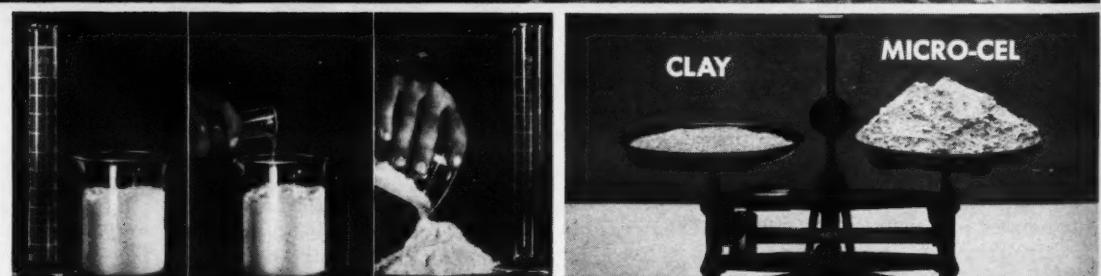
Uses: For encapsulating and impregnating electronic components.

Features: There is no necessity for blending hardeners or catalysts prior to use. Castings made of the resin become somewhat rubbery at elevated temperatures. As a result, resin can withstand internal stresses and strains that are caused by differences in expansion within the casting, which may be caused by dissimilar materials or temperature gradients within the casting.

Description: One-component epoxy resins are free-flowing powders. Heat distortion point is low (40°C), but potted components have been used successfully at temperatures from -60° to +200°C. Besides excellent electrical and mechanical properties, resins have good adhesion to metals and a high resistance to water vapor transmission.

(Aritemp Resins are products of Aries Laboratories, Inc., Dept. CP, 270 Park Ave., New York 17, N.Y. . . or for more information check CP 3504 on form opposite last page.)

Announcing... a new line of synthetic



Johns-Manville MICRO

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Absc
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with
of ro
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Visco
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fine p
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Micro
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liquid

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FEB

calcium silicates developed by Johns-Manville Research

MICRO-CEL...

Check its different combination of properties... it may hold the key to lower costs and product improvements in your process formulations.

Johns-Manville's new Micro-Cel line can produce many desirable effects as the following examples illustrate.

Absorption of Liquids—Micro-Cel will absorb 1 to 2½ times its weight of liquids and still remain a free-flowing powder.

Uniform Dry Dispersion—Different Micro-Cel grades with particle sizes as low as .02 microns and particles of rounded to spherical shape provide fast, uniform blending without segregation.

Viscosity Control—Various degrees of viscosity up to a paste or semi-solid can be achieved by adding relatively small quantities of Micro-Cel.

Anti-caking Agent—Micro-Cel's high absorption and fine particle size of less than 0.1 micron effectively control caking of deliquescent products and insure flowability even after prolonged storage.

Bulking Agent—A small percentage of Micro-Cel materially increases the bulk of dry powders—allows control of package density.

Pigment Extender—Micro-Cel's surface characteristics, fine particle size and large specific surface, combined with inertness, indicate its value as a pigment extender.

Suspension Agent—Micro-Cel's different combination of properties provides aid in suspension of heavier solids.

Flattening Agent—Micro-Cel's high absorption, fineness and particle shape indicate its value as a flattening agent.

Reinforcing Pigment—The combination of fine particle size, particle shape, and wetting characteristics suggests the value of Micro-Cel as a reinforcing pigment.

Some Proven Uses

Micro-Cel has already been proven as offering outstanding advantages as an absorbent-grinding aid for high liquid concentrate insecticide wettable powders, as an

-CEL **SYNTHETIC CALCIUM
SILICATE**

A PRODUCT OF THE CELITE DIVISION

When inquiring check CP 3505 opposite last page

anti-caking agent in fertilizers, insecticide dusts, cleansers and detergents. Additional uses are being explored in Johns-Manville's Research Center.

Chemical Composition

Developed after years of research and experimentation by Johns-Manville, Micro-Cel is produced by the chemical combination of lime and diatomaceous silica under carefully controlled conditions. As a result, specific grades are available offering a wide range of physical properties.

RANGE OF PHYSICAL PROPERTIES

Color	white or off-white
*Absorption, % by weight	
Water	300-600
Oil	275-500
Bulk density, lb./cu. ft.	5-15
Ultimate particle size, micron	.02 to .07
pH	8.0-10.0
Moisture (free), wt. %	5-8
Refractive index	1.52-1.55
Available surface area, sq.m./gm.	95-175

*Will absorb 1 to 2½ times its weight in liquid and remain a free-flowing powder.

Samples Now Available

Micro-Cel is now available for laboratory and production evaluation. Write to Johns-Manville for further data on your specific problems. An engineer from J-M's Celite division will be glad to work with you in adapting Micro-Cel to your own particular requirements. Mail coupon today.

Johns-Manville, Box 60, New York 16, N. Y. CP-2

In Canada: Port Credit, Ontario

Please send additional data and samples of Micro-Cel. I am interested in formulating the following products:

Please have local representative contact me

Name _____

Position _____

Company _____

Address _____

City _____ Zone _____ State _____

Adds three analytical grade anion exchange resins

Amberlite IRA-400 (Cl) resin is a strong base anion exchanger deriving its activity from quaternary ammonium groups. It is supplied as the chloride form to minimize adsorption of acidic materials normally present in the atmosphere.

Amberlite IRA-401 (Cl) is a strong base anion exchanger of high porosity. It is of interest in the adsorption and fractionation of high mw materials.

Amberlite IR-45 (OH) is a weakly acidic anion exchange resin which derives its activities from primary, secondary, and tertiary amine groups. It can be operated at temperatures as high as 212°F.

(Amberlite Analytical Grade exchange resins are products of The Resinous Products Div., Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . or for more information check CP 3506 on form opposite last page.)

Toughness, high impact strength found in nylon industrial yarns . . .

have min average tenacity of 6.5 gm/denier

Uses: For industrial applications and mechanical goods.

Features: Yarns impart toughness and high impact strength.

Description: Nylon yarns have a minimum average standard tenacity of 6.5 gm/denier, and will retain 90% of their strength when wet. Now in limited production, yarns will eventually be available in range of 2000 to 50,000 total denier.

(Caprolan tensile-tough nylon yarns are products of National Aniline Div., Allied Chemical & Dye Corp., Dept. CP, 261 Madison Ave., New York 16, N.Y. . . or for more information check CP 3507 on form opposite last page.)

Hexamethylenetetramine properties and uses

Specs, properties, solubilities, handling and storage information, and uses of hexamethylenetetramine, the cyclic derivative of formaldehyde and ammonia, are the subjects of a 12-page technical bulletin. Applications in synthetic resins, explosives, agricultural chemicals, pharmaceuticals, and in the petroleum, rubber, and textile industries are given.

"Hexamethylenetetramine" is issued by Heyden Chemical Corp., Dept. CP, 342 Madison Ave., New York 17, N.Y. When inquiring check CP 3508 on form opposite last page.

prices
start
at

\$98

IN STOCK!

a low-cost, low-volume pump
for corrosive liquids!



CHECK these Eco All-Chem pump features against your needs:

- Capacities: 1-10 gpm at 1750 rpm, up to 150 psi.
- Metal housing: Type 20 or Type 316 stainless steels; Hastelloy C.
- Impellers: Teflon, Neoprene, Formica.
- Flow characteristics: linear non-surfing, non-foaming, non-aerating . . . lowest corrosion rate in pump and accessory piping.
- Positive displacement . . . high suction lift . . . self-priming with non-volatile liquids . . . operates in either direction.
- Drives: Direct motor, V-belt or vari-speed pulley drive.
- Standard parts mass produced and stocked for immediate shipment and for complete interchangeability.
- Adaptable for constant volume transfer, for agitating and pumping shear-sensitive fluids under pressure, and for constant flow metering.
- Handles organic, inorganic, hazardous and radioactive fluids.
- Lowest price in its class . . . the most pump and pump performance for your money.

Write for Bulletin AC56



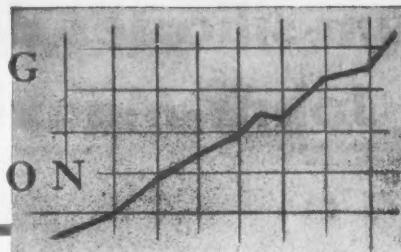
ECO
ENGINEERING COMPANY
the big name in small pumps

Look to ECO for low cost,
high quality, corrosion
resistant rotary and
centrifugal pumps.

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When inquiring check CP 3509 opposite last page

EXPANDING CHEMICAL PRODUCTION



Commercial Isophthalic acid — production set to go

Construction of 50-million lb/yr capacity plant for isophthalic acid in Richmond, California, by Standard Oil Co. of California, will be completed by end of 1955. Product will be marketed by Oronite Chemical Company, subsidiary of Standard of California. Isophthalic is a chemical intermediate for plastics and surface coatings. Plant is first to produce commercial quantities of the material. Process for manufacture was developed during eight years of research by a Standard subsidiary.

Pacific Northwest to get more formaldehyde

Chemical Division of The Borden Company is doubling its West Coast output of formaldehyde by building a new plant near Seattle, Wash. Capacity will be more than 36 million lb/year of formaldehyde. Plant is scheduled for completion late in 1956. Expansion was required by new demand for formaldehyde beyond capacity of the present Borden plant at Springfield, Oregon. Borden anticipates serving area from Western Canada to the San Francisco Bay.

Arkansas Smackover brines to produce bromine

A joint venture operation by the Murphy Corporation and the Michigan Chemical Corporation will use brine from the South Arkansas oil field to produce bromine. Bromine extraction plant will be located near El Dorado, Arkansas. Operations and sales functions will be handled by the Michigan Chemical Corporation. Brine supply and other associated functions will be under direction of Murphy Corporation. Plant is expected to be in production by the fall of 1956.

Pennsylvania Salt to build three additional plants

Projected expansion program of Pennsylvania Salt Mfg. Co. is getting underway with three additional plants to achieve further product diversification and insure availability of basic raw material.

A large organic fluorine chemical plant is to be built at Calvert City, Kentucky. Construction is scheduled to begin at once. Initial products will be used in the refrigerant and aerosol-propellant fields. A complete family of chlorofluorohydrocarbons will be produced, including trichloromonofluoromethane, dichlorodifluoromethane, and monochlorodifluoromethane.

Second plant is being constructed for production of new granular-type commercial fertilizers at Mantua Point in Paulsboro, N. J. Penn Salt's present plant at the Point is now producing conventional commercial and specialty fertilizers.

Third plant is being built, as joint venture of Hooker Electrochemical Company and Penn Salt, to insure availability of salt. The new company, Chemical Salt Production Company, will extract salt from the Great Salt Lake, Utah. Initial cost is over \$400,000. Process used will be solar crystallization. Initial capacity will be approximately 120,000 tons of salt per year, but the operation can be expanded to produce more than one-million tons annually if required.

Monsanto completing plant for alkyl amines

First commercial-scale plant for production of tertiary butylamine in US was completed during December by Monsanto Chemical Company. Unit is designed as a flexible plant for production of a variety of alkyl amines. Production will begin during January. Aliphatic amines are intermediates for emulsifiers, polishes, film-forming agents, bacteriostats.

**News about chemical materials in the US —
plant construction, increased production . . .
on stream now or planned for future**

**Spending 18 million dollars
for boron compounds**

Pacific Coast Borax Company, Div. of Borax Consolidated, Ltd., London, will spend 18 million dollars to change over to open-pit operation at Boron, California. Change in method of production requires construction of new concentrating and refining plants to handle variety of ores recovered in open-pit operations. The change will allow recovery of virtually all the deposit at Boron. The new facilities are scheduled to be in operation by June, 1957.

**Completes expansion
for surfactants**

Paterson, N. J., plant of Mona Industries, Inc., has completed expansion of production capacity by 300%. Company makes surfactants, detergents, wetting agents, emulsifiers.

**Completes expansion program
to manufacture pigment**

Extensive expansion program has been completed by American Molding Powder & Chemical Corp., Brooklyn, N.Y. Complete new line of dry colorants for thermoplastic molding compounds has been developed. One colorant is primarily for coloring polyethylene and vinyl. A dry colorant has been developed for general-purpose and high-impact polystyrene, and polyethylene.

Titanium dioxide plant

Plant has been completed at Savannah, Georgia, by American Cyanamid Company with the investment of approximately 15 million dollars. Construction was started during the summer of 1953. Savannah plant is Cyanamid's 49th production facility and its 20th in the South. Titanium ore will be brought to the plant by boat. Titanium oxide is used in paint, paper, rubber.

**Monsanto triples production
of vinyl paste resins**

Vinyl paste resin capacity will be tripled by Monsanto Chemical Company by June, 1956. Construction of new facilities has already begun. Vinyl paste resins are stir-in formulations, easily compounded into plastiols for fabric coating, slush molding, and production of vinyl foams. One of the paste resin advantages is elimination of milling and grinding operations during compounding process.

**Will put more than four million
into butadiene expansion**

Plans have been formulated for a \$4,350,000 expansion of Lake Charles, La., butadiene plant of Petroleum Chemicals, Inc. Capacity of the plant will be increased from 63,000 to 79,000 tons of butadiene annually. Expansion will be completed by fall, 1956. Petroleum Chemicals, Inc., was organized by Continental Oil Company and Cities Service Company in 1954. The butadiene plant was purchased from the Government early in 1955. Butadiene is one of the principal raw materials for synthetic rubber and some plastics.

**Michigan Chemical acquires
rare earth facilities**

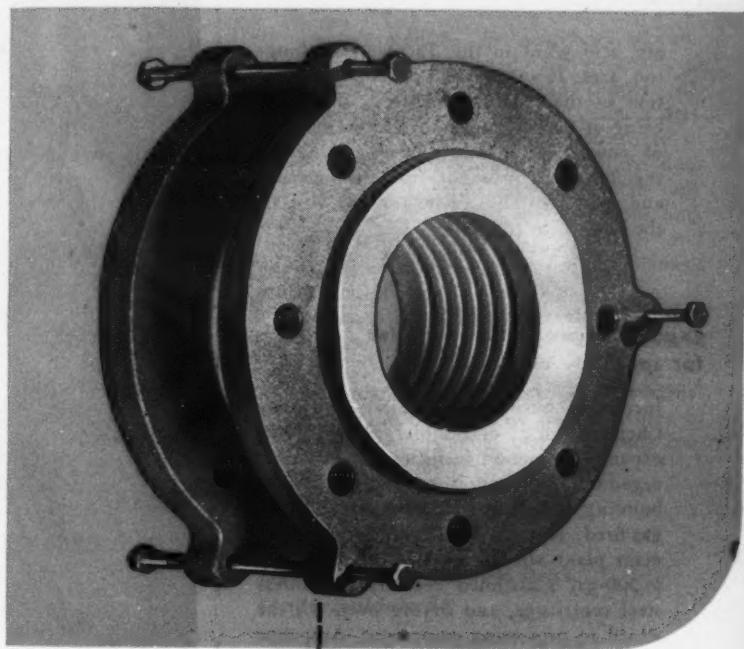
Another entry in the field of rare earths is the Michigan Chemical Company. Assets of the Saturnium Corporation have been acquired, including research facilities at California, Kentucky, which are to be moved to Saint Louis, Michigan.

**RCI to build second plant
in Pacific Northwest**

Reichhold Chemicals, Inc., plans to build a dry adhesive processing plant and warehouse plus a pentachlorophenol and muri-

(Please turn to next page)

**they supply the
"GIVE and TAKE"
for safe piping seals**



**made of du Pont
TEFLON**

Chemiseal Expansion Joints and Flexible Couplings—Made of TEFLO—protect costly chemical piping, usually low in impact strength.

They absorb shock, vibration, thermal expansion and contraction. Correct misalignment. Connect unlike piping ends and nozzles. Eliminate gaskets, adaptors and slip joints. Are impervious to all chemicals excepting only molten alkali metals, fluorine under pressure and chlorine trifluoride.

All TEFLO Expansion Joints and Flexible Couplings are pressure tested at the plant . . . and flexural tested, too, for special requirements.

Write for Bulletin EJ-1155 or ask your U. S. Gasket-Belmont Packing Distributor.



**UNITED STATES GASKET CO.
CAMDEN 1, NEW JERSEY**

U.S. GASKET • BELMONT PACKING

When inquiring check CP 3510 opposite last page

EXPANDING CHEMICAL PRODUCTION

(Continued from preceding page)

atic acid plant in the Tacoma, Washington, area. It will be RCI's second installation in the Pacific Northwest, the other being at Seattle. Site was selected because of power, water, and shipping facilities, together with proximity to raw materials and markets. The Tacoma plant will be the 13th U.S. plant for RCI.

Expanding production facilities for speciality organics

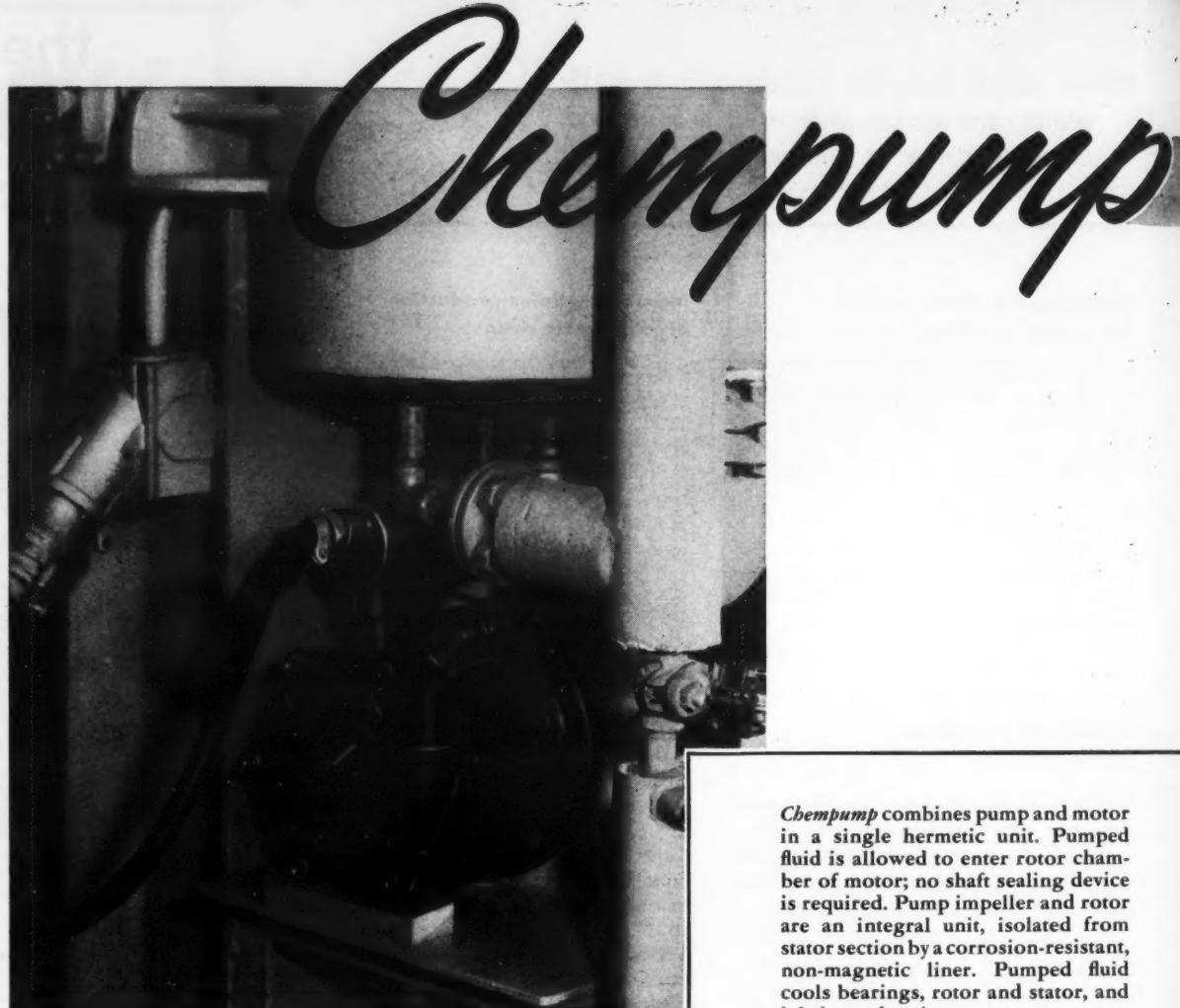
Increasing business has caused Arapahoe Chemicals, Inc., of Boulder, Colorado, to expand production facilities for speciality organics. Company is putting up a new building to house a new boiler and two gas-fired reactors. An addition to the main plant will also be constructed, and a 500-gal glass-lined reactor, a stainless steel centrifuge, and drying oven will be added to processing equipment. Arapahoe makes scintillation compounds, Girard's reagent, cyclopentane derivatives, n-bromosuccinimide, n-bromoacetamide.

Completes portion of program for adhesives expansion

National Starch Products, Inc., has completed a portion of the 3½ million dollar expansion and modernization program with the opening of a new plant for production of rubber and other solvent adhesives. Plant is located at Plainfield, N.J., adjacent to National's present facilities. Products will be especially formulated adhesives for laminating and rigid bonding fields. National has also completed a major addition to its Alexander Research Laboratories, in December, 1955.

Begin production of Fortisan-36 synthetic industrial fiber

Production of Fortisan-36 was begun on a commercial basis at Rome, Ga., by Celanese Corporation of America. Production

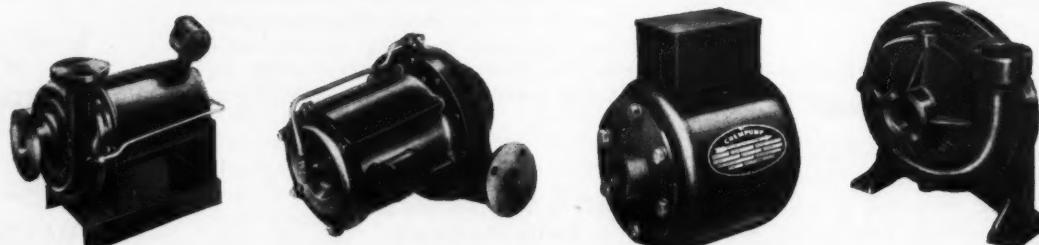


This Chempump, installed at American Viscose Corp., is a $\frac{1}{3}$ hp stainless steel unit which circulates sulfite liquor (magnesium bisulfite containing excess SO₂) through a digester in the sulfite pulping of wood chips. Temperatures range from 100 to 150°C (212 to 302°F). Ambient pressure is approximately 100 psi.

Chempump combines pump and motor in a single hermetic unit. Pumped fluid is allowed to enter rotor chamber of motor; no shaft sealing device is required. Pump impeller and rotor are an integral unit, isolated from stator section by a corrosion-resistant, non-magnetic liner. Pumped fluid cools bearings, rotor and stator, and lubricates bearings.

Approved by Underwriters' Laboratories. Available in wide choice of materials... from $\frac{1}{6}$ to $7\frac{1}{2}$ hp. Capacities to 250 gallons per minute. Heads to 195 feet.

Chempump can't leak!



Chempump — first in the field...process proved

gives superior performance...

at American Viscose Corp.

Only Chempump seal-less pumps provide these cost-saving benefits:

- No seals, no stuffing boxes... can't possibly leak... ends fluid losses
- No lubrication, no external shaft, no coupling... virtually eliminates maintenance
- No contamination of process fluids
- Handles hazardous liquids with complete safety
- Leak-proof under extreme vacuums or pressures

Here's proof:

At the Pulping Pilot Plant of American Viscose Corp., a leak-proof Chempump operates eight hours a day pumping hot sulfite liquor, and is giving very satisfactory service. The pump has been in operation for over a year,

and little or no maintenance is required. The Chempump is far superior to ordinary centrifugal pumps with mechanical or hydrostatic seals. Previous experience with these latter pumps was very discouraging.

Combining motor and pump in a single unit, Chempump is the most significant advance in pump design in half a century. Normally hard-to-handle fluids—volatile, toxic, corrosive, explosive, "hot," or sensitive—just can't leak or become contaminated. The only maintenance required is a simple bearing change... made when required after periodic inspections... without special tools... with only minimum down-time.

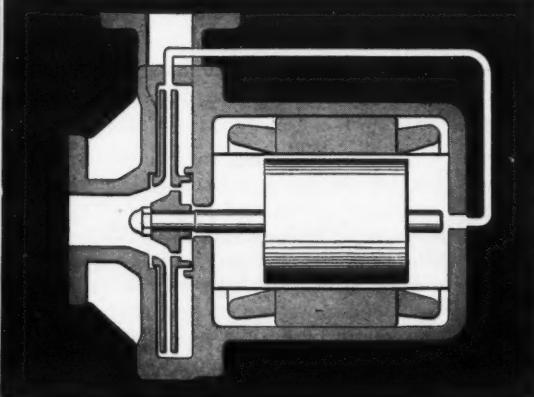
Your process can benefit through Chempump application, too. For more information, send today for new 16-page Bulletin 1010, just off press.

Engineering representatives in over 30 principal cities in the United States and Canada.

CHEMPUMP CORP. • 1300 E. MERMAID LANE • PHILADELPHIA 18, PA.

Please send me details on Chempump for:

(application)
Capacity _____ Total dynamic head _____
Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____



When inquiring check CP 3511 opposite last page

EXPANDING CHEMICAL PRODUCTION

area devoted to the new fiber is completely air-conditioned. All process piping is stainless steel and copper. All tanks, pumps, and valves are stainless steel. The installation covers 60,000 sq ft of floor area and is located on three floor levels of the Celanese plant. Raw materials are charged on the third floor, and, after mixing, filtration, spinning, and saponification, emerge as finished filament on first floor.

Fortisan-36 synthetic fiber was developed for use in heavy industry rather than as apparel. Material has properties of strength, low elongation, dimensional stability which indicate potential uses to be in V-belts, high-pressure hose, conveyor belts.

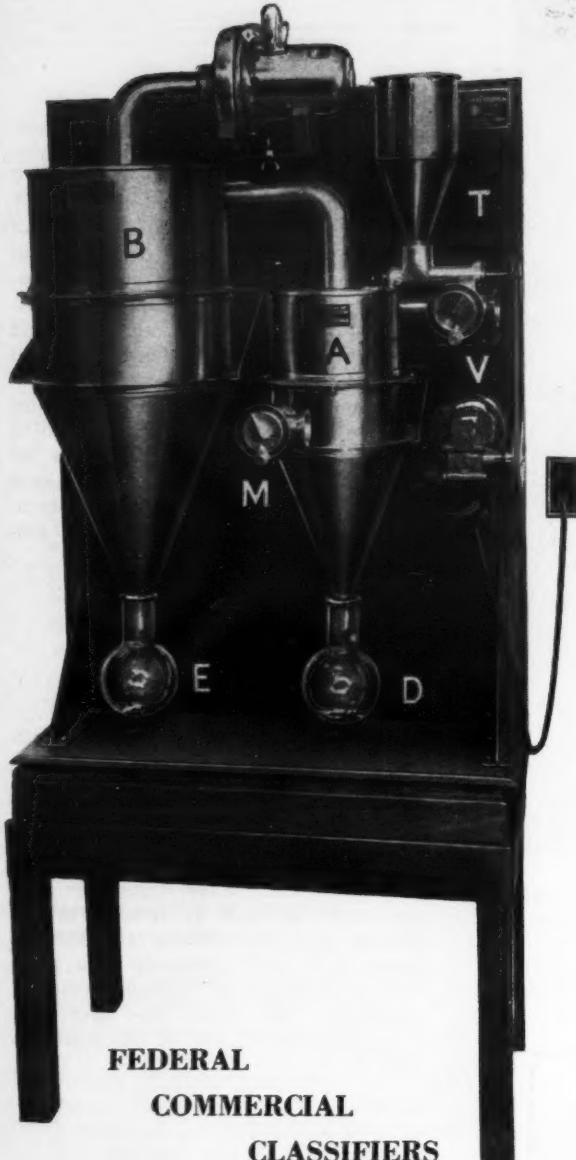
Merck reopens Danville lines for formaldehyde

Formaldehyde production unit at Merck & Company's Danville, Pa., Cherokee plant is being activated. Unit has 15 separate production lines, each with an annual capacity of several million lb of formaldehyde. Facilities were originally constructed for the Government in 1942 and were operated as recently as the Korean emergency. Merck acquired the property in 1950, primarily as a plant site for production of Cortisone, vitamins, antibiotics. The fifteen lines have been completely modernized in the shutdown interval.

More liquid alum is required by southern paper

American Cyanamid, already a major producer of alum, plans to build a liquid alum plant in Plymouth, North Carolina. Plant will be sufficient size to handle current and anticipated needs of paper industry in Virginia and North Carolina. Raw material will be furnished by Cyanamid's bauxite mines in Arkansas and Georgia. Sulfuric acid will be furnished also by Cyanamid facilities.

Federal Laboratory Air Classifier
shown below is precision instrument, efficient at 2.5 microns and handles 100 to 120 pounds of dense material per hour. Mesh of fines under instant control with valve M. Send for Bulletin 30.



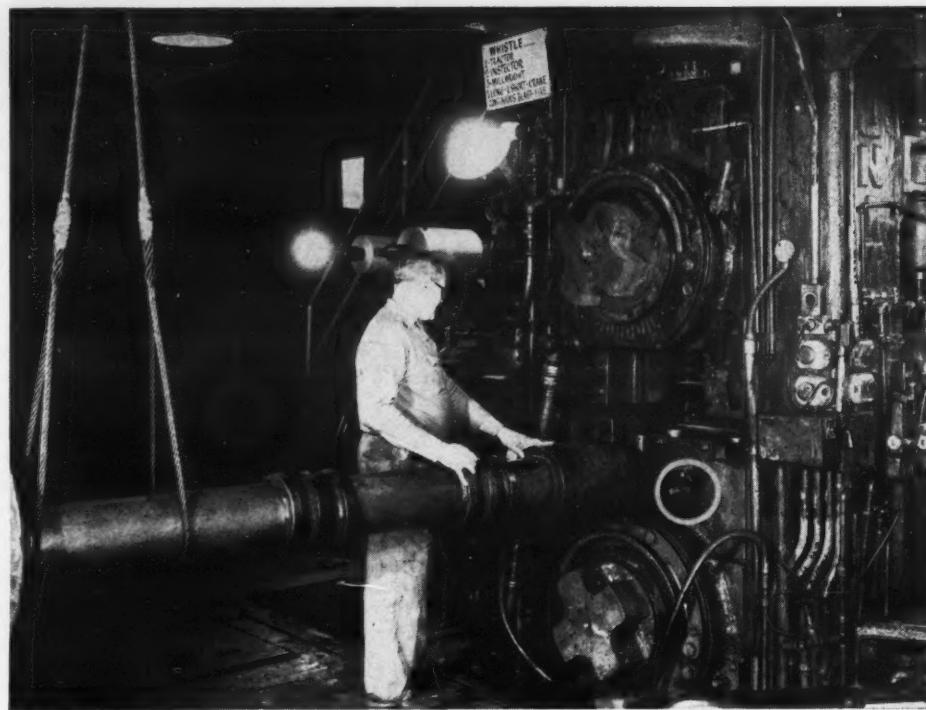
**FEDERAL
COMMERCIAL
CLASSIFIERS**

are built in 33 standard sizes and connect with any mill. Compound systems deliver catalysts. Explosions nil, due to automatic hinged blow-off doors. Best known brands of diatomaceous earth, activated carbon, graphite, carbon black and cement, plus metallic powders are refined with Federal Classifiers. Send for Bulletin 5.

FEDERAL CLASSIFIER SYSTEMS, INC.
127 N. Dearborn St., Chicago 2, Ill.

When inquiring check CP 3512 opposite last page

ideas — from other industries and nuclear field . . .
new trends in research, processes, services



**Quick-connect couplings (circle around one in above photo)
on high-speed strip mill simplify roll changing and . . .**

slash mill downtime

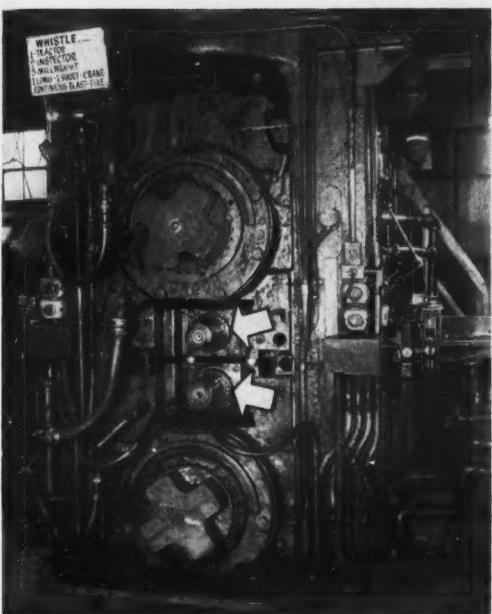
**Withstand 850 psi, wipe out time loss
formerly encountered when opening
and closing fluid-line fittings**

Problem: Excessive downtime encountered every time the work rolls had to be changed on the high-speed 56" reducing mill was resulting in costly steel production losses at Crucible Steel Company, Midland, Pennsylvania. Biggest bottleneck was the coupling and uncoupling of the fluid lines connected to the rolls. This part of the job alone accounted for more downtime than the entire period needed (about 20 minutes) for the remainder of the roll changing operation. Cramped space and surrounding projections made use of wrenches on the threaded fittings very difficult. Some lines carry fluids at 850 psi, so extreme tightening was necessary to make them leak-proof.

The mill rolls stainless steel strip to a mirror finish for use as trim, mirror frames, etc. Since inspection department rejects any that has the slightest surface blemish, the work rolls have to be changed as soon as the roll surface shows any sign of deterioration. Because of this and other production factors, rolls are changed about twice every eight-hour shift.

Solution: To cut downtime to a minimum, engineers decided to use quick-connect, quick-disconnect couplings on the fluid lines. Couplings have design features which make them well-fitted for this application. Connections and disconnections can be made in matter of seconds. To avoid hose twisting and eventual breakage, couplings permit full swiveling of flexible hose about stationary pipe fittings.

As shown in the accompanying drawing, couplings have ring seal which abuts against nipple when



End view of 56" single-stand four-high reducing mill at Crucible Steel Company. Arrows point to work rolls which have to be changed about twice every 8-hr shift. Note fluid-lines connected to lower roll

the coupling is closed — thereby making a tight seal as soon as it is connected. Fluid pressure expands lips of seal, making coupling leakproof at high pressures.

To avoid time loss required for shutting off valves, couplings have built-in check valves which snap closed the instant the coupling is opened. Full flow is resumed as soon as coupling is reconnected.

Results: In use now for over five years, couplings have practically wiped out the time loss due to opening and closing fittings. Overall roll-changing time is now a constant factor that can be counted on in production scheduling.

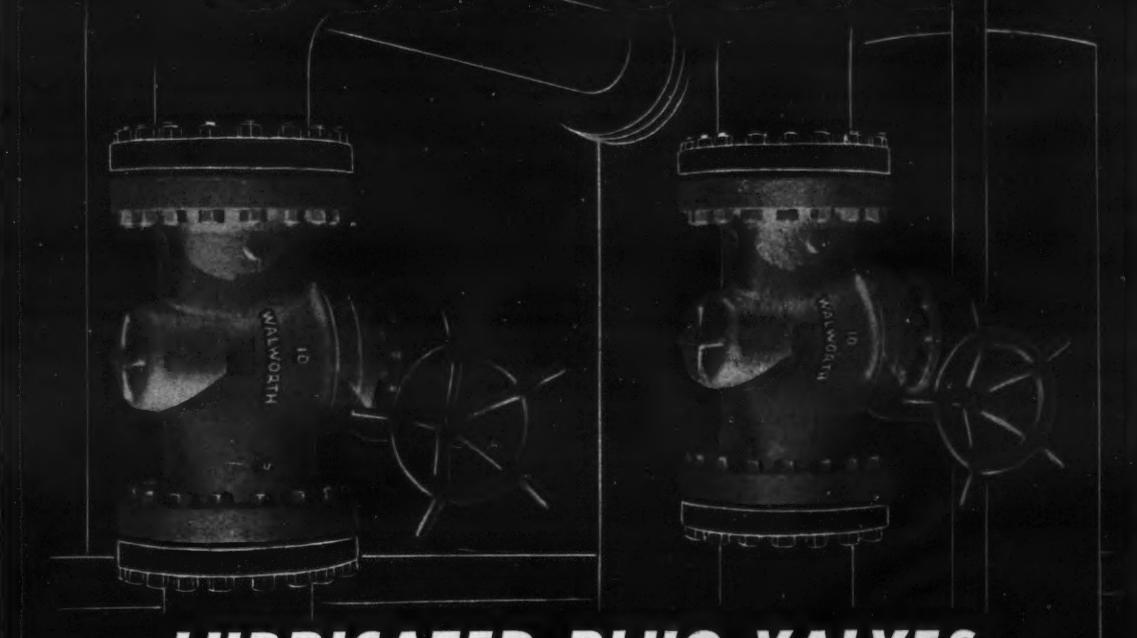
Maintenance on couplings is negligible. Every so often a worn seal ring has to be replaced, but this is done quickly by pulling out the old one with a long-nosed plier and snapping a new one in its place. No disassembling or reassembling is required.

(Quick-seal couplings are product of Titeflex, Inc., Dept. CP, 10 Hende Street, Springfield 4, Mass. Check CP 3513 opposite last page.)



Drawing shows coupling in disconnected (left) and connected (right) positions. Spring-loaded (A) check valve, with seal (B), keeps fluid line closed when coupling is disconnected. Ring seal (C) assures leak-proof fit when coupling is connected

WALWORTH



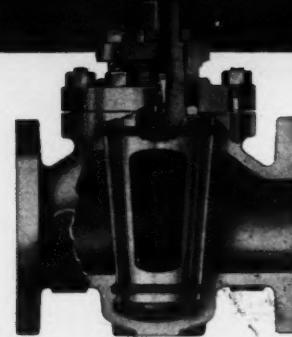
LUBRICATED PLUG VALVES

Better because ... They are pressure sealed with an insoluble lubricant readily renewed while the valve is in service. Lubricant completely surrounds the plug ports assuring a tight seal against leaks. It also insures ease of operation by reducing friction between the body and the plug while at the same time protecting the finished surfaces against corrosion and wear.

Walworth Lubricated Plug Valves are the most satisfactory valves available for the handling of gritty suspensions, and many other destructive, erosive, and corrosive industrial and chemical solutions.

They are ideal for general refinery and pipeline service.

For full information see your Walworth Distributor, or write for your copy of Bulletin 111. Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Lubricant system of a Walworth No. 1700F Regular Gland, Wrench Operated, Steel-Iron, Lubricated Plug Valve. Other Walworth Lubricated Plug Valves include Single Gland, and Ball Bearing types. Sizes to 30-inches — pressures to 5,000 psi, and for vacuum service.

WALWORTH

Manufacturers since 1848

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

When inquiring check CP 3514 opposite last page

HAMMOND IRON WORKS

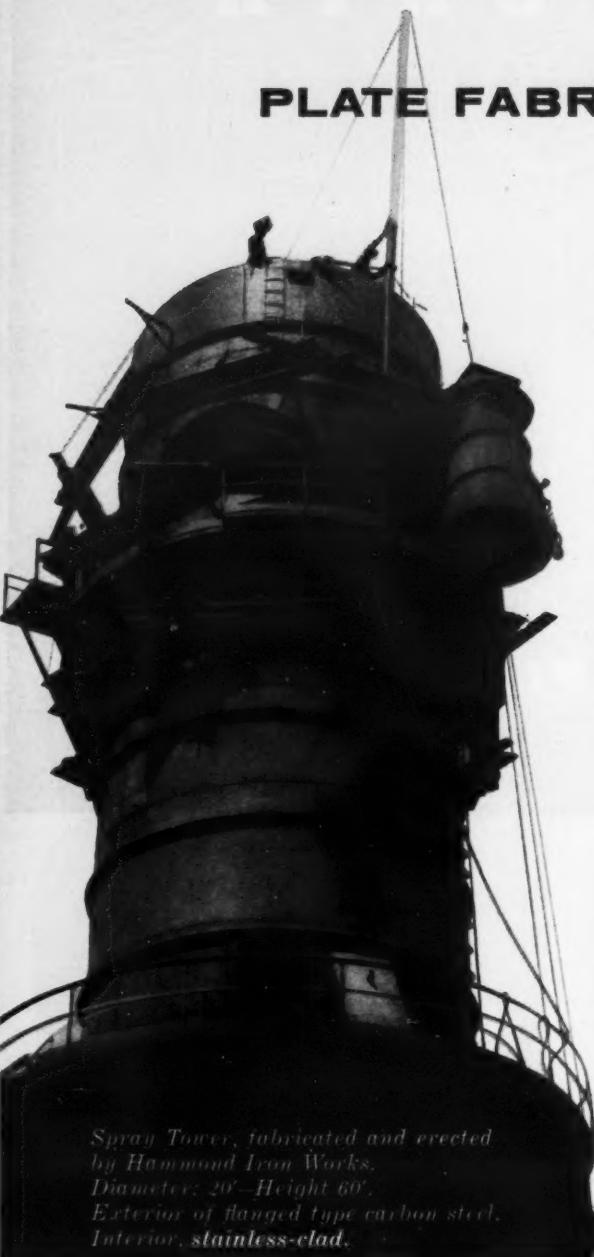


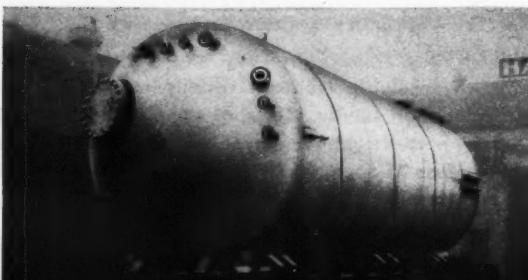
PLATE FABRICATION

AND ERECTION

of Vessels, Tanks, Towers, odd and intricately designed chemical equipment...to any size...of any material: steel, aluminum, stainless, stainless-clad, special alloy, etc.

HAMMOND has a background of more than 50 years' successful service to the chemical industry. With its 5 plants and its know-how, based upon experience, no job is too large or too small for Hammond.

*Catalog 54B illustrates the Hammond story
... write for your copy.*



One of 12 Decanters, fabricated and erected by Hammond Iron Works.
Diameter: 10' 6"-Length 36' of $\frac{3}{4}$ "
Solid stainless, type 304.

**HAMMOND
IRON WORKS**

WARREN and BRISTOL, PA. • PROVO, UTAH • CASPER, WYO. • BIRMINGHAM, ALA.

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When inquiring check CP 3515 opposite last page

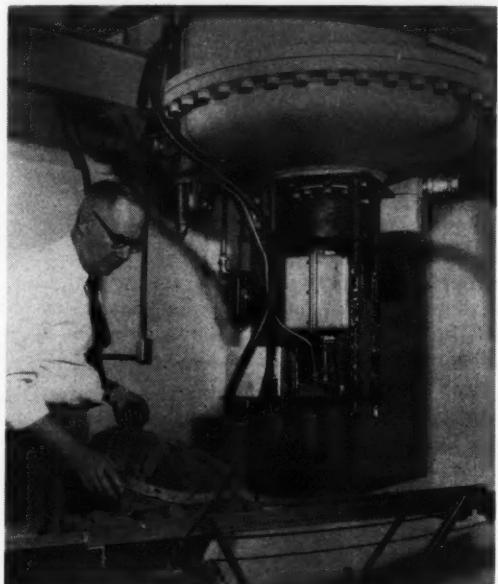
IDEAS

Top penetrating power planned for new electron beam generator . . .

two-million-volt unit to operate at $1\frac{1}{2}$ milliamperes, have output of 2100 watts

New triple-powered electron beam generator being developed for use in sterilizing foods and drugs and in producing improved chemicals will operate at two million volts and $1\frac{1}{2}$ milliamperes, with an output of 2100 watts. The electron beam will be swept back and forth across a rectangular field 8" wide.

Unit is one of four types of electron beam generators being produced or developed by General Electric. The others are 1) a two-million-volt machine operating at $\frac{1}{2}$ millampere and emitting



Million-volt electron beam generator is used on research projects at Michigan State College School of Agriculture

a circular beam that is $2\frac{1}{2}$ " in diameter; 2) a one-million-volt machine operating at 3 milliamperes with a rectangular beam 8" in width; and 3) a one-million-volt unit operating at 1 millampere with a $2\frac{1}{2}$ " diameter beam.

Rates for the purchase or rental of the equipment have been revised to enable smaller users to employ the apparatus more economically. Equipment was formerly available only on a rental basis.

(Electron beam generators are product of X-ray Department, General Electric Company, Dept. CP, 4855 Electric Avenue, Milwaukee 1, Wisconsin . . . or for more information reader may simply check CP 3516 on the convenient form which is located opposite last page.)

Atomic energy challenges insurance business

Special problems are facing both the engineering profession and the insurance business as a result of the expanding commercial development of nuclear power. The entire nuclear insurance program is complicated by a lack of forecast liability and formulas for calculating loss potentials as well as a lack of standardization of atomic equipment.

Preliminary studies indicate that the catastrophe potential, although more serious than anything heretofore known in industry, is remote because of rapid progress made in engineering and safety. Research and commercial reactors are insurable at commercial rates and can be considered in the category of the more hazardous types of chemical operations. Studies are still being continued, however, on matters of "third-party liability", "business interruption", and "use and occupancy" insurance.

(Summary of talk given at Lake Placid meeting of AIChE by Mr. Matthew M. Braidech, Director of Research for the National Board of Fire Underwriters, Dept. CP, 85 John St., New York 7, N. Y.)

Describes sludge heating units

Details on the application, construction, and operation of digester sludge heating units are presented in 20-page bulletin. Photographs, drawings, and tables cover control data, piping details, and other aspects of the equipment. Short historical section is also included.

Bul 24S82 is issued by Walker Process Equipment Inc., Dept. CP, P.O. Box 266, Aurora, Ill. When inquiring specify CP 3517 on form opposite last page.

For more information on product at right, specify CP 3518 . . . see information request blank opposite last page.



A. D. Schnurr (right), Kalo Brick & Tile Company president and Standard Oil lubrication specialist Roland C. Bleimehl discuss plant lubrication requirements. Providing technical service on lubrication is something for which "Rollie" Bleimehl is well qualified. Rollie is a mechanical engineer with a degree from Iowa State College and a graduate of the Standard Oil Sales Engineering School. He's been an industrial lubrication specialist for 10 years with the Standard Oil Company. Customers find his experience and training pay off for them.



Large open gear, such as this one in Kalo Brick & Tile plant, suffered excessive gear tooth wear until their Standard Oil man suggested switch to CALUMET Viscous. New lubricant eliminated throw off, reduced gear replacement and maintenance.

CALUMET Viscous Lubricant solves gear lubrication problem for Kalo Brick & Tile Company

Long-time Standard customer receives another demonstration of effectiveness of Standard Oil Products and technical service.

The Kalo Brick & Tile Company, Fort Dodge, Iowa was experiencing trouble with the lubrication of open gears. The lubricant used lacked adhesive qualities and was being thrown off resulting in excessive gear tooth wear. In addition, the lubricant had to be heated before application.

As they had done in so many cases during sixty-five years as a Standard Oil customer, Kalo management called in a Standard industrial lubrication specialist. Inspection and recommendation by the Standard man resulted in a switch to CALUMET Viscous Lubricant for open gears. Kalo Brick & Tile Company got these results: gears received an effective shield that did not throw off, life of gears was lengthened and lubrication maintenance and attention greatly reduced, no pre-heating of CALUMET Viscous Lubricant was required so this messy job and the preheating equipment were eliminated.

No matter what the problem, chances are Standard Oil lubricants and technical service can help you solve it. Try them. Call your nearby Standard Oil lubrication specialist in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Kalo Brick & Tile Company plant, Fort Dodge, Iowa found solution to gear lubrication problem by using CALUMET Viscous Lubricant.

Quick facts about CALUMET Viscous Lubricant

- Not a residual product but a true grease carefully manufactured from selected soaps, oils and additives.
- Good wetting ability. Gives lubricant superior adhesiveness, makes it resistant to washing.
- Has very high load-carrying capacity. CALUMET Viscous grease formula is especially designed to provide effective shield under heavy load.
- Resistance to heat. Since it is a true grease compound, CALUMET Viscous has extreme stability, does not thin out under high heat.



STANDARD OIL COMPANY
(Indiana)

Full proceedings of Geneva atomic energy conference to be published . . .

will consist of 16 volumes of about 500 pages each

Proceedings of the International Conference on the Peaceful Uses of Atomic Energy, held in Geneva last August, will be published during early 1956. Consisting of 16 volumes of approximately 500 pages each, the proceedings will constitute the complete, unabridged record of the Conference, together with a record of discussions concerning each paper.

Following are the tentative titles of the 16 volumes:

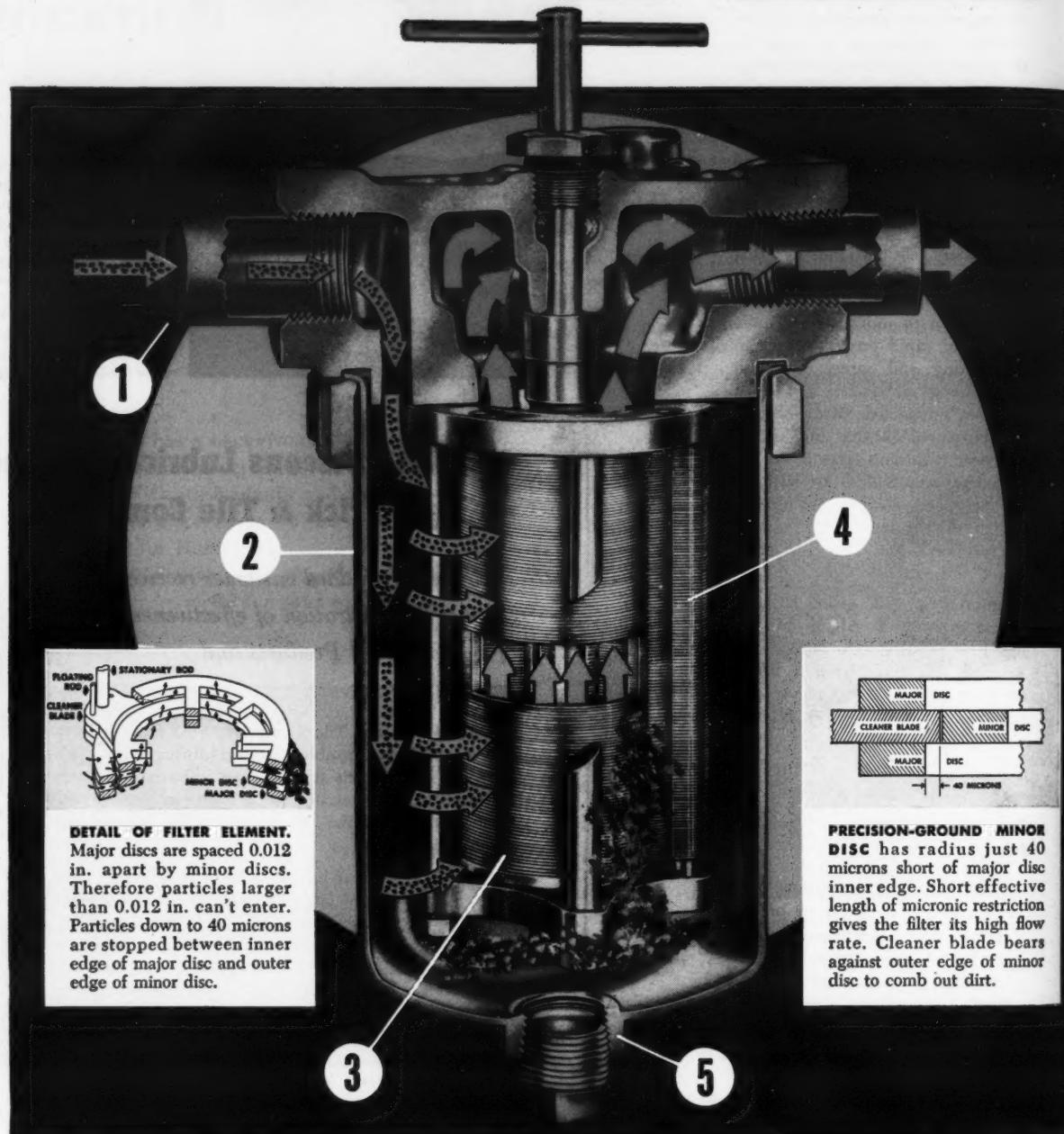
- 1) The World's Requirements for Energy; The Role of Nuclear Power
- 2) Physics; Research Reactors
- 3) Power Reactors
- 4) Cross-sections Important to Reactor Design
- 5) Physics of Reactor Design
- 6) Geology of Uranium and Thorium
- 7) Nuclear Chemistry and the Effects of Irradiation
- 8) Production Technology of the Material Used for Nuclear Energy
- 9) Reactor Technology and Chemical Processing
- 10) Radioactive Isotopes and Nuclear Radiations in Medicine
- 11) Biological Effects of Radiation
- 12) Radioactive Isotopes and Ionizing Radiations in Agriculture, Physiology, and Biochemistry
- 13) Legal, Administrative, Health and Safety Aspects of Large Scale Use of Nuclear Energy
- 14) General Aspects of the Use of Radioactive Isotopes, Dosimetry
- 15) Applications of Radioactive Isotopes and Fission Products in Research and Industry
- 16) Record of the Conference

Pre-publication price for the full series is \$110. Individual scientific papers presented at the meeting may be purchased at 25c each.

(Orders for series, or individual volumes, may be placed with United Nations sales agents or the United Nations Headquarters Bookshop, Dept. CP, United Nations, New York.)

The alphabetical Product Directory (starting on page 222) will give you a page reference to all articles and advertisements in this issue

New! CUNO 40-micron S



CUTAWAY of new SUPER Auto-Klean. Dirty liquid enters inlet (1) at left, fills housing (2) and flows through metal-edge filter (3) of stacked major and minor discs. Trapped dirt is combed out by cleaner blades (4) when discs are rotated and is removed through drain (5). Clean liquid rises through center of filter element, leaves at right.

self-cleaning filter!

The SUPER Auto-Klean FOR PROCESS LIQUIDS

... and you can clean this filter by simply turning the handle!

Many times smaller than other micronic filters of equal capacity, Cuno's new SUPER Auto-Klean filter now makes possible economical, compact, micronic filtration at high flow rates and eliminates the need for replacement cartridges. Here's what SUPER Auto-Klean offers the process industries:

1. Micronic filtration with a self-cleaning filter. Filter can be cleaned continuously with motor drive or intermittently by manually turning handle.
2. Eliminates cartridge changes. Ends operating costs if you've been using cartridge filters.
3. No pressure drop build-up. An 8-in. long, 2½-in. diameter cartridge handles 30 gpm of liquid at 50 centipoise viscosity with only 3 psi pressure drop—up to 75% more with slightly higher pressure drop.
4. Positive protection against particles larger than 40 microns (actually 0.0015-in.). Filter can't rupture or channel.
5. Much smaller than replaceable-cartridge-type filters of equal capacity, you save on lower initial costs,



ENGINEERED FILTRATION

Removes More Sizes of Solids from More Kinds of Fluids
 AUTO-KLEAN (edge-type) • MICRO-KLEAN (fibre cartridge)
 FLO-KLEAN (wire-wound) • PORO-KLEAN (porous stainless steel)

MAIL COUPON FOR COMPLETE INFORMATION

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<input type="checkbox"/> Casein	<input type="checkbox"/> Grease	<input type="checkbox"/> Resins
<input type="checkbox"/> Cellulose acetate	<input type="checkbox"/> Industrial alcohols	<input type="checkbox"/> Rust proofing compounds
<input type="checkbox"/> Chlorinated solvents	<input type="checkbox"/> Japan	<input type="checkbox"/> Sizing
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CUNO ENGINEERING CORPORATION

5-2 South Vine Street, Meriden, Conn.
 Please send me full data on the NEW Cuno SUPER Auto-Klean filter.

Name _____

Firm _____

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Address _____

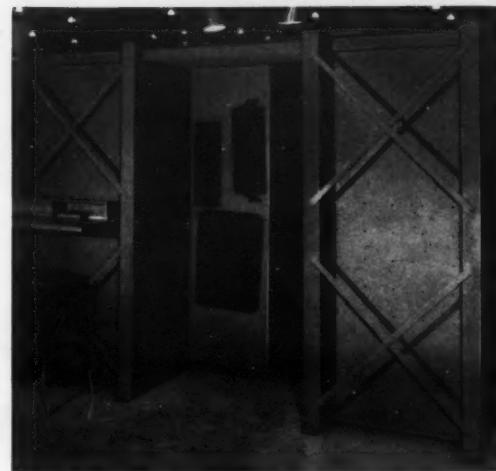
City _____ Zone _____ State _____

Orderly system for storing tools, templates, gaskets . . .

equipment features self-contained desk which folds away when not in use

An orderly system for filing and storing templates, patterns, gaskets, and flat tools has been made available. Called the "Templa-File", the equipment contains two dozen 36 x 80" sliding panels. Each panel is numbered and suspended on rollers operating on roll-formed track. Each panel will independently support 600 lb of suspended weight.

Featured in the equipment is a self-contained record or reference desk which folds back into the unit when not in use. Attached to desk is a swing-out tabulating card file for ease in locating or filing.



Unit contains 24 sliding panels for holding templates, gaskets, similar items. Fold-away desk and card file can be seen at left

Overall dimensions of equipment are 9'6" wide, 31" deep, and 7' high. Unit occupies less than 25 sq ft of floor area. Net weight is 1500 lb. Capacity of equipment is 2880 sq ft. Additional units may be attached to back, or to either side.

(Templa-File is product of the DeLuxe Metal Furniture Company, Dept. CP, 306 Struthers Street, Warren, Pa. . . . check CP 3520 opposite last page.)

Nuclear reactor simulator assembly built around analog computer

Nuclear reactor simulator which electronically synthesizes operating characteristics of a true reactor is described in four-page bulletin. Nerve center of the assembly is an analog computer.

Folder ND46-70-700(2) is issued by Leeds & Northrup Co., Dept. CP, 444 N. 16th St., Philadelphia 30, Pa. Check CP 3521 opposite last page.

When inquiring check CP 3519 opposite last page



New and better equipment for making, storing and shipping phosphorus compounds is being devised today with nickel and its alloys. This new tank

car, for example, is the latest way to ship phosphorus oxychloride in bulk. 20% Nickel-Clad Steel gives it long life and insures product purity.

Now, tank cars carry phosphorus oxychloride

Nickel keeps shipments pure permits economical bulk handling

Here's the first of its kind . . . a money-saving new car for shipping phosphorus oxychloride and other phosphorus compounds in bulk.

It's one of two now riding the rails . . . built for Ohio-Apex Division, Food Machinery and Chemical Corporation, by American Car and Foundry Company of 20% Lukens Nickel-Clad Steel. Dome heads and covers, loading covers, safety vent bases, and washout chambers and plugs are solid nickel.

For years, 55-gallon nickel drums have been the standard means of shipping phosphorus chlorides safely. The nickel containers not only withstand corrosion but also protect the contents against contamination by metallic corrosion products. Now the extension of

nickel protection to tank cars permits even greater economies and ease of handling.

For this application, OHIO-APEX says, "... most satisfactory material . . . from every angle."

Pool of experience data on tap

Inco maintains data on hundreds of applications of nickel and its alloys in acid chloride environments. Here is information that may be worth thousands to you. So, if you make or handle acid chlorides and have a corrosion problem, write Inco's Corrosion Engineering Section. Do it today.

® Registered Trademark

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street
New York 5, N. Y.

Inorganic Acid Chlorides in which satisfactory use of Monel or Nickel is recorded

Corrosive Media	Monel	Nickel
Aluminum Chloride.....	Yes	.....
Ammonium Chloride.....	Yes	Yes
Antimony Chloride.....	Yes	.....
Arsenic Trichloride.....	Yes	Yes
Magnesium Chloride.....	Yes	Yes
Manganese Chloride.....	Yes	.....
Nitrosyl Chloride.....	Yes	Yes
Phosphorus Oxychloride.....	.....	Yes
Phosphorus Trichloride.....	.....	Yes
Silicon Tetrachloride.....	.....	Yes
Sulfur Monochloride.....	Yes	Yes
Sulfuryl Chloride.....	Yes	Yes
Tin Tetrachloride.....	Yes	.....
Titanium Tetrachloride.....	Yes	.....
Zinc Chloride.....	Yes	Yes



Nickel Alloys

... for product purity

When inquiring check CP 3522 opposite last page

IDEAS

New radiochemistry laboratory established by NBS . . .

will prepare, distribute, and maintain standard samples of 57 nuclides and ores

New radiochemistry laboratory for use in preparing and distributing standard samples of radioactive materials has been established by the National Bureau of Standards. Laboratory will be primarily responsible for handling samples of approximately 57 different radioactive nuclides and ores. Included in this group are carbon-14, sodium-22, phosphorus-32, cobalt-60, iodine-131, and gold-198. New uses for these and other nuclides in industry, physics, and medical research and therapy have greatly increased the demand for standard samples of radioactivity.

Five rooms combine to make up the laboratory: an office; two specially equipped "hot" rooms for handling bulk material and for basic and applied chemical research; a counting room where 2π formamide calibrations can be performed; and a "C-14 and H-3 room" where internal gas and liquid scintillation counting facilities are provided for low-energy beta emitters. The "hot" rooms are also used for the preparation of radioactive sources for nuclear spectroscopic research.

Laboratory is located on top floor of an existing building. Site was selected because it permits simple arrangement for proper disposal of radioactivity from exhausts of chemical hoods. Flow of air through hoods is around 4000 cfm, the air entering the laboratory through filters to prevent excessive deposition of dust particles. Laboratory facilities also include equipment for remote control operations under the hoods and specially built lead and concrete protective shieldings.

(Information courtesy of National Bureau of Standards, US Department of Commerce, Washington 25, D. C.)

Atomic energy law reports

Aimed at bringing together everything pertinent to federal and state regulation of the peace-time uses of atomic energy, new CCH Atomic Energy Law Reports are available to interested parties on a subscription basis. Service includes issuance of basic "Compilation Volume" which brings subscriber up to date on what has transpired since the enactment of The Atomic Energy Act of 1954, and the mailing of timely report releases throughout the subscription period. Subscriptions are \$240 per year; \$225 per year on two-year basis.

(CCH Atomic Energy Law Reports are published by Commerce Clearing House, Inc., Dept. CP, 214 N. Michigan Avenue, Chicago 1, Illinois . . . or check CP 3523 on form opposite last page.)

Leak detecting method saves utility company \$100,000 a yr . . .

cuts fuel wasted in boilers due to undetected air leaks

New leak-detecting method devised by Consolidated Edison Company of New York is reported to save that company an estimated \$100,000 a year in fuel and maintenance costs. Savings are based on anticipated reduction in the amount of fuel wasted in boilers because of undetected air leaks.

In the process, a boiler is closed off and forced draft is admitted until pressure builds up to 0.3-0.5" of water. A fogging machine then introduces Pydraul F-9 (a fire-resistant hydraulic fluid) into the unit. Machine breaks down the fluid into tiny flotation droplets which enter boiler by a hose through an access door or other opening (for pressurized boilers, hose connection is made to a 4 1/2" gate valve).

Fog is generated until all leaks are observed and marked on boiler's exterior walls. Minimum downtime is required since fog is neither so plentiful nor so obnoxious as to hamper leak detection.

The Products Division of Todd Shipyard Corporation helped perfect the fog applicator. Method can also be used to detect leakage in turbines and condensers when turbines can be sealed at the turbine shaft.

(Pydraul F-9 is product of Monsanto Chemical Company, Dept. CP, St. Louis 4, Missouri . . . or for more information check CP 3524 on form opposite last page.)

"A LITTLE NONSENSE NOW AND THEN . . ."

... is relished by CHEMICAL PROCESSING readers (and editors). We're looking for cartoons and cartoon ideas dealing with chemical work. Want to join in the fun?

If you're artistic, draw your cartoon in black ink on an 8 1/2 x 11 sheet, ready for reproduction. We'll pay \$10 apiece for these on acceptance.

If you (like most of us) find drawing a chore, send along a short written description or rough sketch of your cartoon scene, and the caption. These are worth \$5 apiece on acceptance.

Share the wit! Send your cartoon to:

Cartoon Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Ill.



HALF the world is half asleep! Men who could be making *twice* their present salaries are coasting along, hoping for promotions but doing nothing to bring themselves forcefully to the attention of management.

They're wasting the most fruitful years of their business lives . . . throwing away thousands of dollars they may never be able to make up. And, oddly enough, they don't realize—even remotely—the tragic consequences of their failure to forge ahead while time is still on their side.

These are the men who are unknowingly headed for the frustrations and the disappointments of mediocrity. They'll go part way up the ladder and down again by the time they're fifty years old. They'll be executive material in their twenties and thirties—and clerks in their fifties. They'll have high hopes for themselves and their families while they're young; but only struggling, skimping and regret later on when their earning power should be at its height.

Send for Your Free Copy of "Forging Ahead in Business"

If you want to discover how to succeed while you are still young—if you want to avoid the heartbreak of failure in later years—send today for "Forging Ahead in Business" . . . one of the most practical and realistic booklets ever written on the problems of personal advancement.

Here you will find—not a "pep talk," not an academic lecture—but cold, hard facts on how to improve your position and increase your income. You will be told what the qualifications of an executive are in today's competitive market . . . what you must *know* to make \$15,000, \$20,000 or more a year . . . what you must *do* to accumulate this knowledge.

"Forging Ahead in Business" was written for mature, ambitious men who seriously want to get down to bed-rock in their thinking about their business future. If you feel it is meant for you, simply fill in and return this coupon. Your complimentary copy will be mailed to you promptly.



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Engineer-accountant consultants tackle problem of overhead — cut costs 50%

Analyze operations, set up cost centers in previously uncontrolled areas

In an attempt to provide management with adequate control tools to keep pace with industrial progress, a management consulting group has assigned a team of engineers and accountants to work with client firms in the development of controls for overhead items. Here's how they handle a typical assignment:

First they analyze historic areas of indirect cost and manufacturing overhead. From this analysis, it is possible to define cost centers on the same basis as direct labor. Next steps are:

- 1) Development of a cost accounting system applicable to each cost center (such as machine maintenance)
- 2) Development of performance time standards for each of the major areas of expenditure of indirect man hours and overhead monetary standards for other cost areas
- 3) Development of a system of production, scheduling, and control within each cost center
- 4) Development of an incentive pay system for personnel within each of these areas

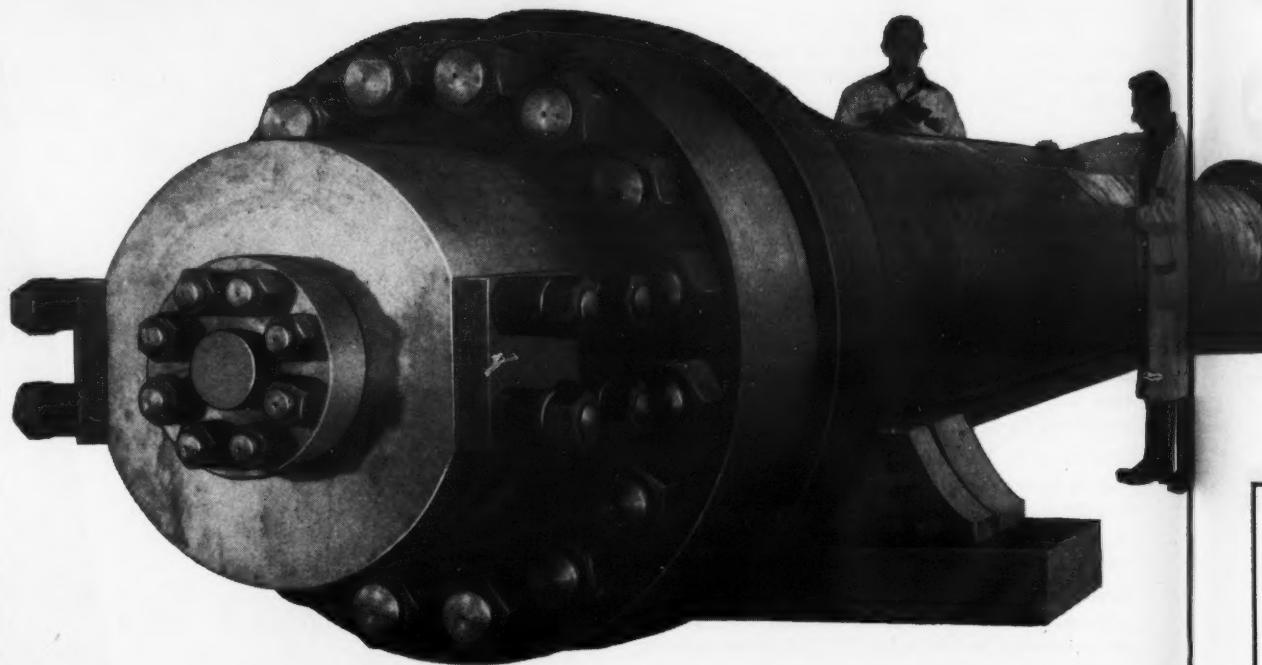
Net results which have been achieved in plants are:

- 1) Reduced costs (up to 50%) for each cost center
- 2) Increased productivity for each class of labor
- 3) Discontinuance of many records costly to maintain and of little value
- 4) Reduction of personnel in each department covered in this way
- 5) Increase in take-home pay in each cost center
- 6) Down-time on important equipment used as part of factory production decreased by more intelligent and effective maintenance.
- 7) Projected need for new equipment decreased by proper maintenance of existing production facilities
- 8) More effective measurement by management of each cost center, since information had become available where little or none previously existed
- 9) More accurate methods available for pricing the product

By utilizing techniques of budgeting, scheduling, accounting, standardizing, and controlling in areas previously uncontrolled, each cost center becomes a little business within a business. It is then possible to determine whether it would be cheaper to subcontract some work, or whether it would be more advantageous to discontinue the sub-contract.

Costs of accounting decrease in most instances because meaningless historic records are abandoned. Accounting and controls are routinized, centralized, and become more efficient. Most important, super-

8000 pressure vessels...8 ex

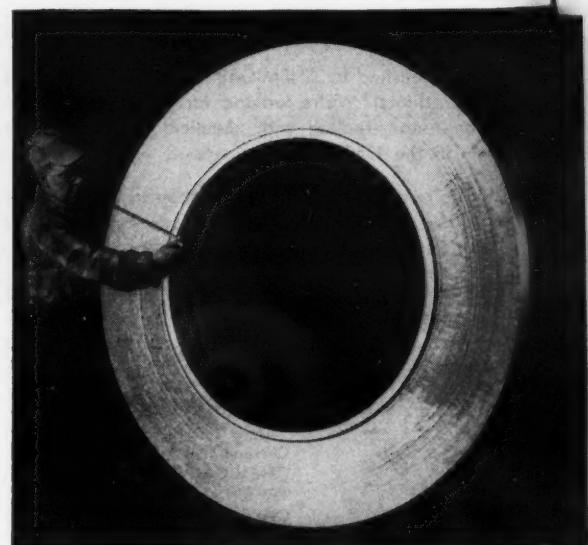


MULTI-LAYER AMMONIA CONVERTER

Built for operating pressures of 12,500 psi.
... test pressures of 18,750 psi.
Wall thickness 9 1/16 in. . . . I. D. 23 3/16 in.
Overall length is 44 ft. Weight 238,000 lbs.

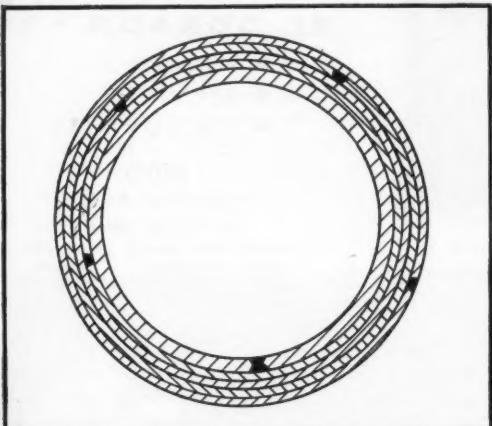


SAFETY — Nearly 8000 MULTI-LAYER vessels in operation — and not a single failure — certainly convincing proof of the safety inherent in this unique A. O. Smith design. To further prove operating safety, we have actually tested many full-scale, high-pressure MULTI-LAYER vessels to destruction. In every case, vessels rupture without shattering or fragmentation.



...8000 reasons why you can depend on exclusive **MULTI-LAYER** CONSTRUCTION

FOR SAFETY
FOR ECONOMY
FOR FLEXIBILITY



ECONOMY — Savings start with fabrication. Instead of using thick plate in a single wall, MULTI-LAYER vessels are built up from concentric layers of relatively thin steel plate . . . progressively wrapped, tightened and welded together around an inner, pressure-tight cylinder. No need for costly stress-relieving in field assemblies. And for corrosive operations, only the inner shell requires special alloys.

FLEXIBILITY — With MULTI-LAYER, there's no limitation of size or weight for your vessel design. You can design for higher pressures, too. Walls can be made stronger simply by increasing the strength of the steel used or by adding more layers. Since shell sections can be welded together in the field, vessel length is not limited.

See how A. O. Smith's exclusive MULTI-LAYER construction can provide safety, economy and flexibility in your own operations. Write our nearest office. We'd be happy to provide more detailed information about MULTI-LAYER construction for high-pressure vessels.

Through research  ...a better way

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When inquiring check CP 3526 opposite last page

FEBRUARY, 1956

visory time is devoted to supervision and less to mechanical paper work.

No labor unrest usually results. Normal shifts and attrition absorb persons who are displaced. Intelligent handling by management in planning these changes acts as a catalyst between reductions in force and displaced personnel.

(Summarized from paper by Mr. R. P. Miller, Assistant General Manager, Wolf Management Engineering Company, Dept. CP, 7 South Dearborn Street, Chicago 3, Illinois.)

**Helicopter maintenance cut
by fluorochlorethylene
sight glasses . . .**

used on transmissions, they resist corrosion, shock, vibration, ageing, temps to 300°F

Oil-level sight glasses made of Kel-F trifluorochloroethylene plastic are easing maintenance problems for operators of helicopters. Used on transmissions, the plastic proved the only material which would combine properties of resistance to corrosion, temperatures, aging, shock, and vibration — and still stay transparent indefinitely.

Chemically inert to oils, acids, and sludges, the material does not swell, shrink, or lose its rigidity over a temperature range of -65°F to 300°F. Its high compressive strength and resiliency permit mounting bolts to be pulled tight without shattering or cracking the sight glasses. Because of its "non-sticking" characteristics, accumulations of sludge deposits on interior of the glasses are minimized.

(Plastic sight glasses are made by Nichols Engineering Inc., Dept. CP, Old Stratford Road, Shelton, Conn. . . check CP 3527 opposite last page.)

**Process makes high-quality steel
at ton-a-minute rate**

Capable of producing high-quality, low-cost steel at rate of nearly a ton a minute, new oxygen converter process is arousing wide interest in steel industry. Developed and first applied in Austria in 1952, process consists of introducing a stream of high-velocity, high-purity oxygen to the surface of a charge of molten pig iron, iron ore, and limestone.

Construction costs of facilities are reported to be less than half that of open hearth furnaces. Steel produced is particularly suitable for cold-rolled strip and sheet. Process appears to be a complement to open hearth process, not a substitute.

(Oxygen converter process is being licensed in US by Kaiser Engineers, a division of Henry J. Kaiser Company, 1924 Broadway, Oakland 12, California . . . check CP 3528 on form opposite last page.)

KILL FOAM THE EASY WAY...

New G-E silicone Anti-Foam 60 disperses easily—pays for itself

CONVENTIONAL ANTI-FOAM



Conventional high-viscosity silicone anti-foam agents (above) do not disperse readily in water—require vigorous stirring.

NEW G-E ANTI-FOAM 60



Low-viscosity G-E ANTI-FOAM 60, however, can be poured—and disperses instantly!

PAYS FOR ITSELF

You'll find ANTI-FOAM 60 pays for itself by the way it reduces processing time, eliminates costly boil-overs, increases kettle capacity. Incredibly small amounts are needed, for example: **50 PPM in paper-making operations**, **3 PPM in textile sizing solution**, **10 PPM in latex**

FREE
SAMPLE!

SILICONE PRODUCTS DEPARTMENT
GENERAL ELECTRIC COMPANY
Section 60-1C, Waterford, N. Y.

Please send me a free sample of G.E.'s new silicone ANTI-FOAM 60.

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Firm _____
Street _____
City _____ Zone _____ State _____

IN CANADA: Mail to Canadian General Electric Company, Ltd., Toronto



Progress Is Our Most Important Product

GENERAL  ELECTRIC

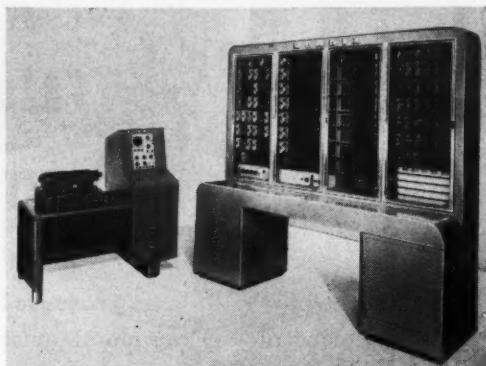
When inquiring check CP 3529 opposite last page

IDEAS

Low initial and operating costs featured in medium-speed electronic computer

Designed to fill the need for low-cost computing services among small and medium-size organizations, medium-speed electronic computer is reported to cost less than half that of most other machines with equivalent abilities and speed. Ideal for business data processing, industrial control, data reduction, and record keeping, machine can be adapted readily to data-handling equipment already in use in many organizations.

Instructions and data can be fed into unit by means of electric typewriters, punched paper or magnetic tapes, or through IBM cards, which it will accept at rate of 100 cards per minute. Computer can reproduce its output data in several



Low-cost electronic computer can be adapted to data-handling equipment already in use in many organizations

forms, including typed copy or punched paper tape on electric typewriters at rate of 10 characters per second; IBM cards at rate of 100 cards per minute, or on magnetic tape. Machine can also transpose computed results onto plotted charts or graphs, which it draws at rate of one point per second.

Output can be used to operate automatic production and process control equipment, too. When used in this way, computer serves a dual purpose; it will calculate data required to produce a part or control a process, then record the results in a choice of three media that can be used to operate the control equipment involved. In addition, unit can continue computing during this output cycle, and can be programmed for automatic tabulation of the output data.

In addition to its low initial cost, computer's physical design has been planned to reduce maintenance problems to a minimum. One competent technician, trained in the basic operation of digital computers, can maintain the machine efficiently. Every electronic component (except memory drum

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METHYL ESTERS

FEATURE CONTROLLED CHEMICAL COMPOSITION

... so you get better and easier control during processing . . . plus a better, more uniform end product.

SPECIFY EL DORADO FOR

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93-95% purity

Elbo's high purity gives you better processing . . . greater uniformity in your finished products.

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*T.M. Reg.

For samples and specifications, write
Dept. P.



P. O. Box 599, Oakland 4, Calif.

When inquiring check CP 3530 opposite last page

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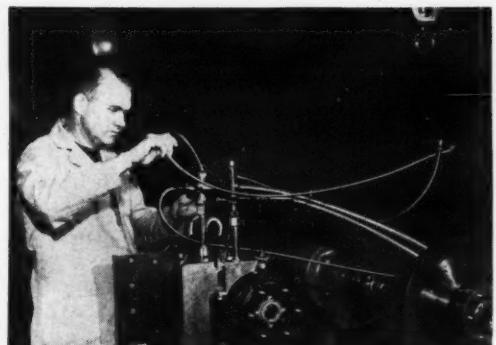
(Readix electronic computers are manufactured by the J. B. Rea Company, Inc., Dept. CP, 1723 Cloverfield Boulevard, Santa Monica, California . . . or for more information check CP 3531 on form opposite last page.)

**Production testing problem solved
by fluorocarbon resin hose . . .**

handles hydraulic fluid at temperatures up to 350°F, shows no sign of wear after 400 hours

Fluorocarbon resin hose has solved an annoying production testing problem at Sundstrand Machine Tool Company, Rockford, Illinois. Plant produces hydraulic speed drives which are used for driving constant-frequency alternators on jet engines. The hose is used for circulating hydraulic fluid through the drives when they are tested. During production tests, synthetic hydraulic fluid is circulated at temperatures up to 250°F. Experimental testing calls for fluid temperatures up to 350°F. Fluid must be kept clean to avoid contamination of units under tests.

Conventional hose eroded within a short period of time and replacement costs were excessive. A variety of hose materials were investigated, but none proved adequate. Fluorocarbon hose has shown no sign of wear or erosion even after 400 hours of testing.



Operator attaches hose assemblies to constant-speed drive mounted on 200-hp dynamometer

The hose is highly resistant to corrosion and can withstand temperatures from -100°F to +450°F. It is unaffected by oils and fuels. Hose is supplied with a jacket of stainless steel armor braid. Assembly is rated at 1000-psi working pressure.

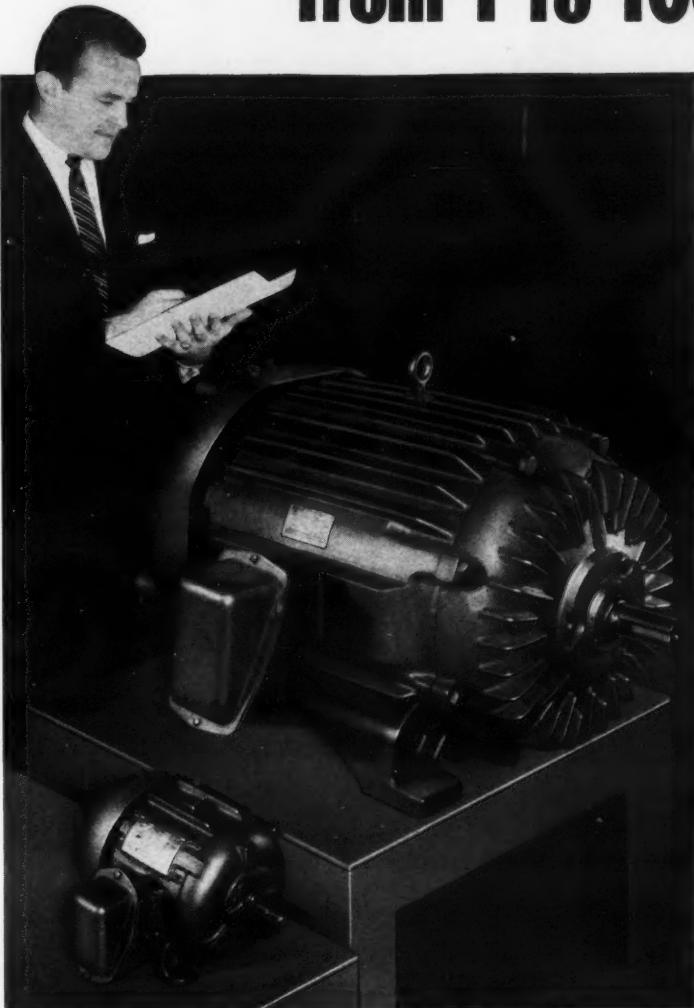
(Resistoflex R500 hose is product of Resistoflex Corporation, Dept. CP, 39 Plansen Street, Belleville, New Jersey . . . or for more information check CP 3532 on handy form opposite last page.)

**There's
MORE . . .**

rating selection available in Allis-Chalmers MOTORS

To meet processing needs . . .

Allis-Chalmers Offers Complete Line of Rib-Type MOTORS from 1 to 100 Hp



Allis-Chalmers, a pioneer in rib-type TEFC motor design, is the only leading manufacturer offering a complete line of these motors from 1 to 100 hp. The many cost-saving features of deep-rib construction can be applied in a variety of uses . . . both indoors and out.

Here's why these motors can cut processing costs:

MORE cooling surface — Rib-type design provides reserve cooling capacity in dirty locations.

MORE iron — Cast-iron frame and external parts assure rigidity and resistance to corrosion.

MORE copper — Allis-Chalmers greater use of copper increases electrical life.

MORE lubrication provisions — Large grease reservoirs surround bearings. Provision made for in-service relubrication — important where moisture or corrosive vapors contaminate grease.

As a new machinery component or as replacement, specify Allis-Chalmers. To find out more, contact your nearby Allis-Chalmers distributor, district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-4947

ALLIS-CHALMERS



When inquiring check CP 3533 opposite last page



with **VISKON** filter fabric **YOU** can Lower Unit Cost!

- ✓ **VISKON Cuts Downtime:** Filter cake practically falls off VISKON due to fabric's unique smooth surface. Takes only seconds to clean by merely scraping or low pressure hosing.
- ✓ **VISKON Increases Production:** Frequent shut-downs are eliminated. Filter cycles increase as much as 35% due to longer continuous line flow.
- ✓ **VISKON Reduces Cost of Filter Medium:** This filter fabric is so inexpensive it can be thrown away after a one-time use or can be quickly cleaned and reused. Eliminates the laundering of costly filter cloths.
- ✓ **VISKON Has High Flow Rate:** Special bonding prevents filter cake from becoming enmeshed in the fibers. This permits high flows with low pressure drop.
- ✓ **VISKON Achieves Clearer Filtrate:** Diatomaceous earth will not pass through VISKON.
- ✓ **VISKON Has Excellent Wet Strength.**
- ✓ **VISKON Withstands Normal Filtering Temperatures And Pressure.**

"Less Downtime - More Production!"

Cutting per unit cost of operation is the challenge of every plant engineer in America. That's why VISKON Filter Fabric is used more and more throughout the country.

Because of its many unique features, VISKON is proving in plant after plant that it can cut downtime

...step up production... give you clearer filtrate.

We invite you to investigate VISKON—the modern filter fabric. Let our engineers answer your specific questions. See for yourself the many advantages of filtering with VISKON—make a trial run in your own plant.

MAIL THIS COUPON NOW

Or Write Your Letter of Inquiry To:

Mr. A. I. Pierce, Filter Media Engineer

THE VISKING CORPORATION, DEPT. CP-2
P. O. Box 72 • North Little Rock, Arkansas

Name _____

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Type of Filter Press _____

see our catalog in
S PLANT
ENGINEERING
FILE
or write for copy

VISKON

nonwoven fabrics

When inquiring check CP 3534 opposite last page

IDEAS

Thinking of buying a filter? Here are facts needed to get proper unit

Too frequently filter manufacturers receive inquiries for filter recommendations which do not include sufficient facts to enable them to prepare such a recommendation. Selection of an effective and economical filter for a specific function requires complete knowledge of conditions under which the unit is expected to operate. To increase the speed (and accuracy) with which such recommendations can be made, here is information to submit:

Fluid: List name and character of fluid in question. This includes description, as drinking water (water), sodium nitrate (chemical), hydrogen (gas), etc; whether it is acid, alkaline, stable, etc (pH should also be shown).

Flow Rate: As filter will be required to handle a given volume of liquid, its size is determined by this factor.

Pressure: Maximum, minimum, and average operating pressures should be given.

Temperature: Temperature at point of filtration should be indicated at maximum, minimum, and average conditions.

Viscosity: Advise fluid viscosity in well-known viscosimeter terms. If viscosity varies at point of filtration, maximum, minimum, and average readings are important.

Contaminants: Filter manufacturer should know name and nature of solid matter to be removed. Indicate particle size. Do not indicate an opening finer than necessary, as cost and size increase as the degree of filtration increases.

Filter: Advise types of materials which are suitable for contact with fluid and state size and type of connections desired.

Use of Fluid: Inclusion of this information permits filter manufacturer to relate application to his past experience.

(Information on filter selection was supplied by The Cuno Engineering Corporation, Dept. CP, Meriden, Connecticut.)

Lists meanings of 7500 color names

Designed to assist the scientist, businessman, and layman to understand color vocabularies, 158-page dictionary lists meaning of 7500 individual color names. Terms used are those of a refinement of method outlined by Inter-Society Color Council and developed at the NBS.

To obtain Cir 553, remit \$2.00 direct to National Bureau of Standards, US Department of Commerce, Washington 25, D.C.

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Oils and greases fail as lubricants in AEC work ...

studies being made on bearings cooled by water

Oils and greases will not play an important part as lubricants for moving parts in the water-cooled nuclear section of atomic power plants. Tests have revealed that organic greases react chemically under irradiation, and quantities of lubricant deposits on fuel elements impede heat transfer.

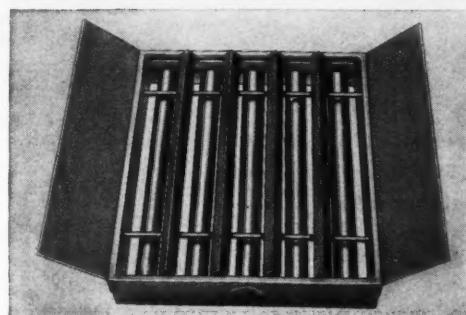
These conditions have made it imperative that research find bearing materials that will be compatible using the cooling water as a lubricant. This is required despite the fact that water is not a good lubricant. It also introduces a corrosion problem, along with the fact that the temperatures of the cooling water range from 200 to 500°F.

Tests made on sliding-type bearings showed that graphite materials were the only ones suitable for high speeds and loads up to 100 psi, provided the journal material was compatible with carbon. Titanium carbide proved superior when used with carbon.

Most troublesome feature on ball bearings were the metallic retainers. These were a constant source of galling and scoring. Tests were conducted without retainers, but with spacer balls placed alternately between load balls, and with micarta, nylon, and rubber retainers. As would be expected, load-carrying capacity of any bearing tested using water as lubricant was only a few per cent of that of a similar oil-lubricated bearing.

(Summary of paper presented at Diamond Jubilee semi-annual meeting of The American Society of Mechanical Engineers, by Mr. A. Smaardyk, Associate Engineer, Argonne National Laboratory, Dept. CP, P. O. Box 299, Lemont, Ill.)

For more information on product at right, specify CP 3535
see information request blank opposite last page.



THE GREAT GRATE MAGNET. It took a great design idea to provide magnetic protection for free-flowing material. With the Eriez Grate Magnet, baffle bars break the flow of material, direct the stream onto powerful magnetic tubes of stainless steel, so designed that the accumulation of tramp iron does not create choke-ups. The Eriez Grate Magnet prevents tramp iron damage to valuable equipment and prevents product contamination to free-flowing foods, chemicals, etc. Want more information on this product? . . . request Bulletin B-204.

Eriez' free booklet "Magnetic Ideas" can help you. Send for it without obligation. Address: Eriez Manufacturing Company, 73B Magnet Drive, Erie, Pa. Or, on your specific request Eriez' factory-trained field men backed by Eriez' laboratory and engineering know-how will be happy to study your particular problem, make a plant survey and offer helpful "Magnetic Ideas".

AND HOLDING ON BY A MAGNET! There's quite a drop at the feet of this scaffold worker . . . but he is in no danger. He is holding on by a permanent-powered, reliable Eriez Magnet. This idea of permanent dependability is the reason why you find so many Eriez Magnets at work in industry today preventing fires, machinery damage and product contamination. All Eriez Magnets are non-electric, self-contained. They operate without any wires or attachments. Best of all their magnetic power last* a lifetime. The first cost is the last.



PULLEY CUTS CUSTOMER COMPLAINTS. At the Chicago Stock Yards Compost Co., "Fertilife" organic compost is produced. Bacterial processes speed up the composting period of the waste material (cow manure) and in four days the manure comes out as an odorless, weed-free compost. Previously, hinges, nails, even horseshoes managed to sneak into the bags of fertilizer. An Eriez Magnetic Pulley, recently installed at the end of the conveyor line that moves the dry material, now removes all traces of metal from the product. Customer complaints about tramp iron in the fertilizer have been completely eliminated.

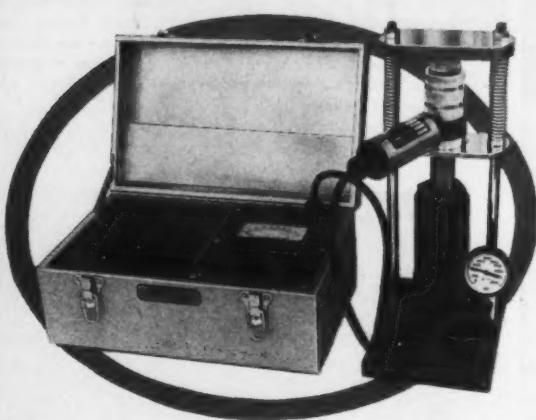
Magnetic ideas from **ERIEZ**



ERIEZ MAGNET FINDS FINES. Sheridan Products, Inc., Racine, Wis., maker of firearms, ran into trouble when drilling gun barrels. Coolant oil, pumped through the drills, returns along the drill flutes, passes through a screen to remove metal chips, then flows to a reservoir for re-pumping. But microscopic fines drilled from the barrels passed through the screen, damaged the pumps. When the flow of oil slowed down, it formed a thick mass, broke expensive drills. The problem was solved when an Eriez Permanent Magnetic Ferrous Cleaner was installed in the line ahead of the reservoir. Now, as contaminated oil passes over the cleaner, all traces of metal are removed; only purified oil goes to the reservoir.



Moisture Costs Money!



Save the high costs of too much or too little moisture! Measure moisture content quickly, economically with **Granular Moisture Register G5** — insure product uniformity and quality!

1 minute test! No stopping for time-consuming, expensive laboratory tests.

Accurate readings to 0% within close tolerances!

Use on production line! Voltage regulated electronic power supply, or battery operated. No skilled technicians required.

Two Weeks Free Trial! Test the G5 in your plant. No obligation. Satisfaction is guaranteed.

Guaranteed accuracy on these products!

Ammonium Nitrate
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Plastic Molding Compound
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Dozens more powdered or granular materials, including many foods.

ELECTRONIC MOISTURE REGISTER

Instruments

Moisture Register Co., Dept. CPA, P.O. Box 910, Alhambra, Calif.

We are interested in 2 weeks free trial offer. Send additional information regarding Model G5.

We will want to test in a moisture range from _____ % to _____ %.

Firm Name _____

By _____ Title _____

Address _____

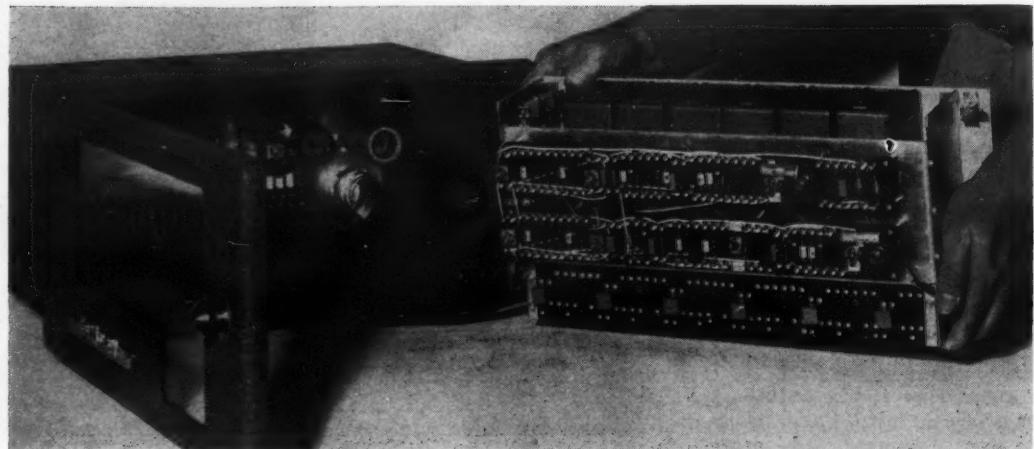
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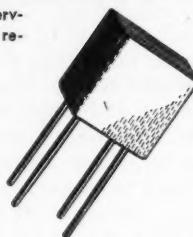
instrumentation & control

Electronic counters for industrial control work are fast, accurate, precise . . . engineers who design them have felt that these devices have not reached their full potential, though, because of the question of long-term reliability in operation. Recent counter design, while still electronic, uses . . .

magnetic elements for reliable, long-life counting



Counter can be easily serviced by "pulling" and replacing sub-units



Basic magnetic amplifier unit has five year operational life — compared with 500 hours for conventional tube

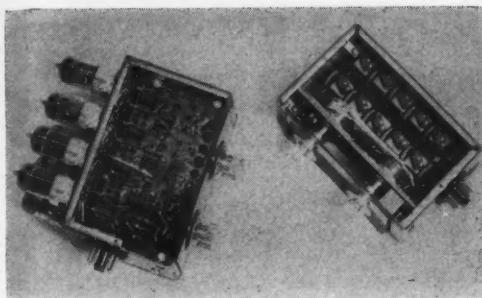
Uses: Electronic counter controls high-speed batching, processing, weighing, counting, and packaging operations precisely. Built-in on-off control operates at preset count.

Features: Magnetic elements replace vacuum tubes in counter circuits for reliable counting. Inherently rugged magnetic element is potted for mechanical and corrosive protection; can withstand enormous overloads.

Description: One bugaboo in improving electronic counter design has been the fragility of vacuum tubes for use where vibration is a factor.

Even with shock-mounting, tube life is usually figured as 500 operational hours for conventional tubes.

In order to provide longer life electronic counters, one school of design has turned to magnetic amplification. With this method speed of response has been a major problem. One recent design shows improved response speed without sacrificing gain or stability. This has been made possible by using basic magnetic amplifying elements which are much smaller than usual. Miniaturization has been a secondary consequence of this design.



Size and "cleanness" of package sub-units for counter are compared. Magnetic amplifier unit is at right

Employing magnetic cores made of molybdenum Permalloy, magnetic units are called "Ferristors." Cores of these elements weigh less than one milligram. Entire unit, core and windings, is a cube, when potted in epoxy resin, measuring only about $\frac{1}{2}$ -inch on a side. Input signal is fed across coil and impressed on secondary winding. Amplifier output is rectified and developed across an RC load and filter circuit.

A practical counter design to use these Ferristors has only two vacuum tubes instead of 54. Tubes are used only in developing low-level RF. Critical counter circuits employ magnetic amplifiers.

Because these magnetic amplifiers are non-aging and have no filaments, they can be expected to have a long operational life. Further, they operate at low current and voltage levels producing little or no heat. These same low levels of current and voltage mean that other circuit components can be operated at a fraction of their normal rating, improving their life, too.

Operated from photocells, magnetic pickups, electric contacts, counting unit will handle rates to 10,000 per second. These counters produce electrical output signals at any two preset totals. Built-in DPDT output relay operates solenoids, solenoid valves, power relays, or other control devices. This output relay is rated for 5 amp.

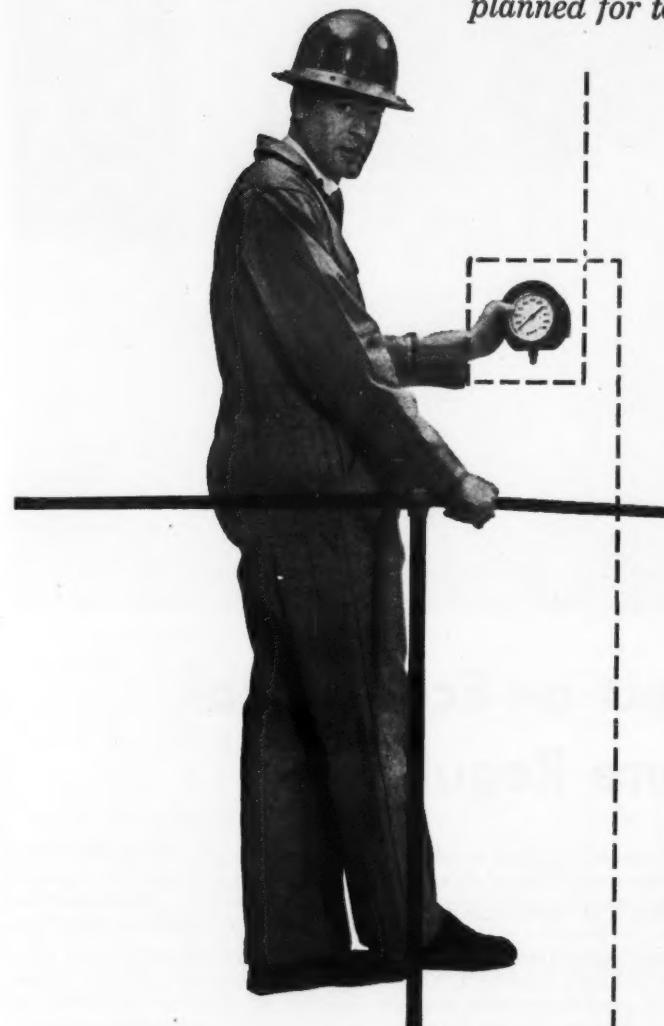
By using fist output signal to slow down operations preparatory to final stop, very close control can be obtained.

Swing-out construction of counter simplifies installation, inspection, servicing. Cover is dust-tight and can be locked to prevent re-setting by unauthorized personnel.

Input sensitivity of counter is 0.1 ma (into 10,000 ohm load). Power requirements are 105/130 or 210/230v, 60 cps, 85 w. Unit measure $18\frac{1}{8} \times 8\frac{3}{4} \times 13\frac{5}{8}$ ". Weight is 50 lb.

(Series 5840 Magnetic Controller is product of Berkeley Div., Beckman Instruments, Inc., Dept. CP, 2200 Wright Ave., Richmond 3, Calif. . . or for more information check CP 3537 on form opposite last page.)

Because
Norden-Ketay
planned for tomorrow...



ACRAGAGE®
SOLID FRONT
PRESSURE GAGES
ARE AVAILABLE TODAY
AT NO EXTRA COST!

The first to apply the advantages of solid front case design to pressure gages as a standard feature . . . Norden-Ketay remains the *only* manufacturer offering you this big plus at no extra cost.

SOLID FRONT CASES—full rear-area blow-out disc provides complete safety in every pressure range; permits quick, easy adjustment and calibration.

CAPILLARY BLEEDER—permits complete filling bourdon tube assembly without necessity of cumbersome equipment for evacuation; provides for purging of bourdon tube assembly.

EXCLUSIVE SHOCKSTOP FEATURE—integrally mounted pulsation dampener is NOT dependent upon restrictive orifices which tend to clog.

PNEUMATIC TRANSMISSION SYSTEMS—pressure indication at the process and in the control area thru transmission of a simple, safe air signal.

For the name of nearest distributor and full details, write for file #062.



NORDEN-KETAY CORPORATION
INSTRUMENT AND SYSTEMS DIVISION
Wiley Street, Milford, Connecticut

INDICATING PRECISION PRESSURE GAGES, REMOTE INDICATING DEVICES,
ANALOG DIGITAL CONVERTERS, FORCE BALANCE PRESSURE TRANSDUCERS,
ELECTROMECHANICAL CONTROL SYSTEMS, AIRBORNE RADAR, SHIPBOARD LINE
CONTROL EQUIPMENT, AIRCRAFT FUEL FLOW INSTRUMENTATION, ACCELEROMETERS

When inquiring check CP 3538 opposite last page



How to Select an Economical Temperature Regulator

First of all, what does economy mean where temperature regulators are concerned? In some industries it means improvement of product or reduction of spoilage through closer control of process temperatures. In others, it means the paring down of operating expense. The price of the regulator itself is a relatively small factor.

Today's buyers are shopping for:

1. Accuracy of control — not only when the regulator is new, but throughout its service life
2. Dependability — to prevent loss of production time
3. Minimum installation and maintenance cost

Here are a few tips on what to look for when you're installing a new or replacing an old temperature regulator —

Packless construction . . . and for this reason: A diaphragm operated, packless regulator minimizes friction. There are no closely fitted parts to stick or bind

because of uneven expansion or collection of foreign matter. Also, there's less maintenance, since no repacking is ever required.

A guarantee against wire drawing of the seats and discs. Insist on it. This guarantee in combination with single seat design assures you of tight shutoff; you avoid expensive steam losses as well as loss of product in a process application.

Broad control range. In a standard regulator you should expect a control range of 100 F. And make sure the unit you select has a vapor tension thermostat that can take over-temperatures of at least 100 F.

Easy maintenance. Why ask for grief? Your temperature regulator should be basically simple in design so that it can be serviced by average plant personnel. All parts should be readily accessible for testing and cleaning.

Double duty. There's no point in buy-

ing a separate pressure regulator when you can select a temperature regulator that combines both temperature and pressure control within the same unit.

Self-operating. Make sure you get a regulator that operates on its own initial pressure. By doing so, you avoid the purchasing and maintenance of an air compressor plus air piping, and you're sure of uninterrupted operation during electric power failures.

• • • •
All of these points are important to you when it comes to selecting an economical temperature regulator. Perhaps you didn't realize you could expect so much. And perhaps you didn't realize that Spence Temperature Regulators offer all these features and more. May we send you our Bulletin T-500 containing further details?

SE 138

SPENCE ENGINEERING COMPANY, INC.
Walden, New York

When inquiring check CP 3539 opposite last page

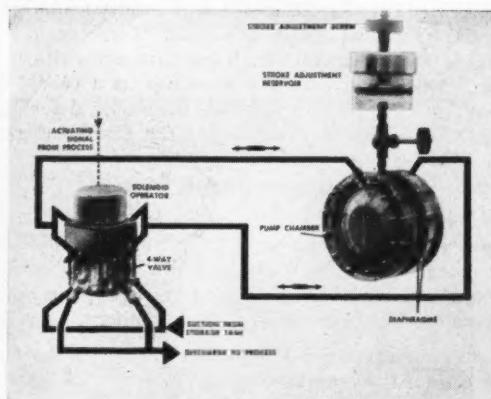
INSTRUMENTATION & CONTROL

Controls "downhill" pumping of liquids or gases within $\pm 1\%$

Uses: Downhill metering of flows of liquids or gases where close control of fluids is necessary.

Features: Pump provides positive-displacement metering, using four-way cam-operated valve and two slack diaphragms.

Description: Pump consists of three units: a pump chamber divided into three parts by two slack diaphragms, a cam-operated diaphragm four-way valve connected to outer pump chambers, a stroke length adjustment reservoir connected to the inner pump chamber.



Four-way valve controls downhill pumping

Pump operates by alternately admitting fluid to each side of diaphragm pumping chamber. As fluid enters metering chamber on one side of diaphragm, fluid is simultaneously pushed from opposite side. Displaced fluid discharges to point of application. When cam rotates 90 degrees, valves 1 and 3 close while valves 2 and 4 open. Cam may be operated either manually, mechanically or electrically with a rotary solenoid valve operator.

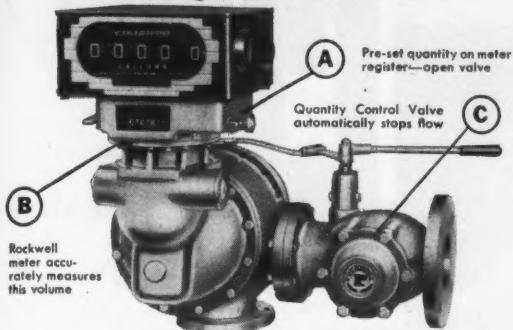
Stroke adjustment is accomplished by varying quantity of fluid in inner pump chamber. As stroke-adjustment screw is turned downward, it causes fluid to be displaced from stroke adjustment reservoir into inner pump chamber. This decreases effective pump chamber volume and pump capacity. Reverse procedure increases pump capacity.

Pump is available without stroke adjustment. This model has only a single slack diaphragm for dividing the pump chamber.

Capacities are approximately 3, 15, 75, and 375 ml/stroke which are equivalent to 1, 5, 25, and 125 gph. Accuracy is within $\pm 1\%$.

(—Delta P pump is product of Milton Roy Company, Dept. CP, 1300 Mermaid Lane, Philadelphia 18, Pa. Check CP 3540 opposite last page.)

Automatic Quantity Control Easy as A.B.C.



Pre-set Liquid Meter Shut-off ...Without Shock

This simple, rugged Rockwell system makes automation available to the process industries. It's the answer to many a costly problem in batching, blending or handling piped liquids. With electrical controls you can "set it and forget it" on repetitive operations. Available in stainless steel, bronze, steel or all-iron construction. Get facts now from Rockwell Manufacturing Company, Pittsburgh 8, Pennsylvania. 106B

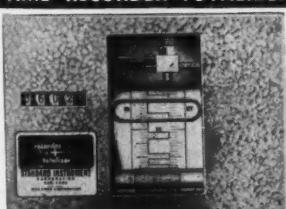
ROCKWELL Industrial METERS

When inquiring check CP 3541 opposite last page

To be sure! YOU CAN GET
BETTER PRODUCTION
IN YOUR PLANT



TIME RECORDER-TOTALIZER



PRICE \$55.

STANDARD INSTRUMENT CORPORATION DIV.
HEAT-TIMER corporation
657 BROADWAY, NEW YORK 12, N.Y.

When inquiring check CP 3542 opposite last page

INSTRUMENTATION

Straight-through flow achieved in cell . . .

conductivity measurements made with ring-electrodes

Uses: Conductivity cell can be installed in process lines for continuous measurement of effluent or material in process.

Features: Ring electrodes are used for self-cleaning operation.

Description: Installing in the same manner as a short length of pipe, conductivity cell is designed specifically for measurement of effluent water of any process. Automatic temperature compensation may be embodied. This is done with a thermistor for automatic temperature compensation. Thermistor may be mounted wholly within the outside pipe structure of the cell.

Wide range of materials is available for housing and cells. Various cell constants can also be provided.

(In-line conductivity cell is a development of Industrial Instruments, Inc., Dept. CP, 89 Commerce Rd., Cedar Grove, N. J. Check CP 3543 opp. last page.)

Small air operator develops 300 lb

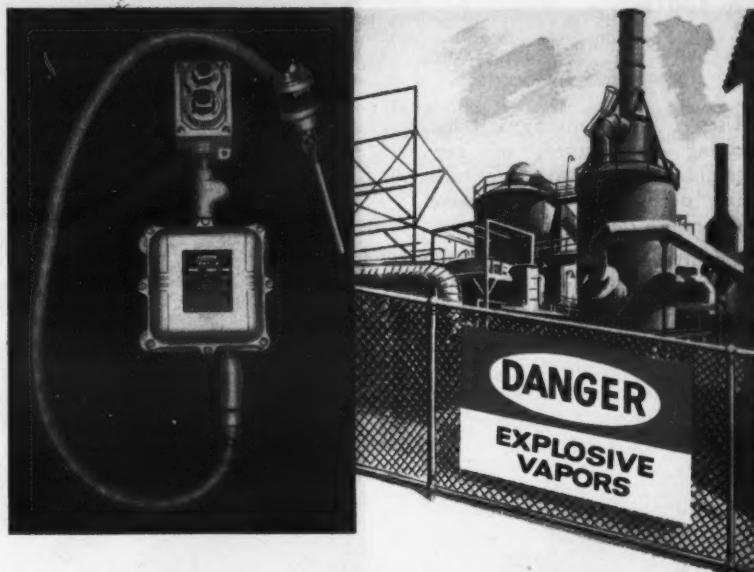
Pneumatically positioned power operator is a compact version of manufacturer's standard series. "Stripped-down" construction brings about lower cost.

Operator is capable of producing stroke lengths to 2" and thrusts of 300 lb in either direction. It can be used with supply pressures to 100 psi. Signal range is 3-15 psi.

(Model B-50 pneumatic operator is a product of Conoflow Corp., Dept. CP, 2100 Arch St., Philadelphia 3, Pa. Check CP 3544 opposite last page.)

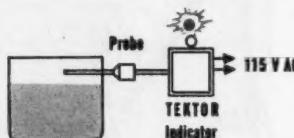


TEKTOR® Electronic Level Control now approved for hazardous areas



Practically every plant can improve level control electronically—and meet safety requirements—now that the entire Fielden TEKTOR System is UL listed and FM approved for Class I, Groups C and D, and Class II, Groups E, F and G, hazardous locations.

This explosion-proof unit features a specially-designed ferralloy housing and Teflon* insulated probe. Available for fail-safe high or low level control, it now brings the simplicity and versatility of capacitance circuitry to areas free of acetylene, hydrogen, or equally hazardous gases.



TEKTOR features

- Controls level of liquids, liquid interface, powders, granular solids (conducting or non-conducting)
- Responds to changes as small as 1/16" in aqueous solutions
- No moving parts—only one radio tube

Robertshaw-Fulton
CONTROLS COMPANY

*Trade-mark for Du Pont tetrafluoroethylene resin.

FIELDEN INSTRUMENT DIVISION

Dept. G, 2920 N. 4th St., Philadelphia 33, Pa.

Please send me the following bulletins:

<input type="checkbox"/> TEKTOR Level Limit Control	<input type="checkbox"/> NULL-BALANCE Recorders-Controllers
<input type="checkbox"/> TELSTOR Continuous Level Indicator	<input type="checkbox"/> SCANNERS
<input type="checkbox"/> TEKOLOG Recorder-Controllers	<input type="checkbox"/> MULTI-POINT Recorders

NAME _____ TITLE _____

COMPANY _____ ADDRESS _____

CITY _____ ZONE _____ STATE _____

When inquiring check CP 3545 opposite last page

INSTRUMENTATION

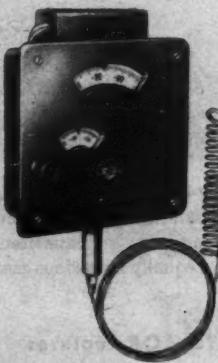
Indicates temperature and controls to 650°F...

unit is self-compensating for ambient temperatures

Uses: Controlling and indicating temperatures of gases, liquids in incubators, water baths, lab ovens, molding machines, laboratory testing cabinets.

Features: Unit indicates and controls within limits of -150°F and +650°F.

Description: Twelve standard models, differing in sensitivity and range, offer range spans of 300°F or 550°F. Approximate off-on differential is 0.5°F. Cali-



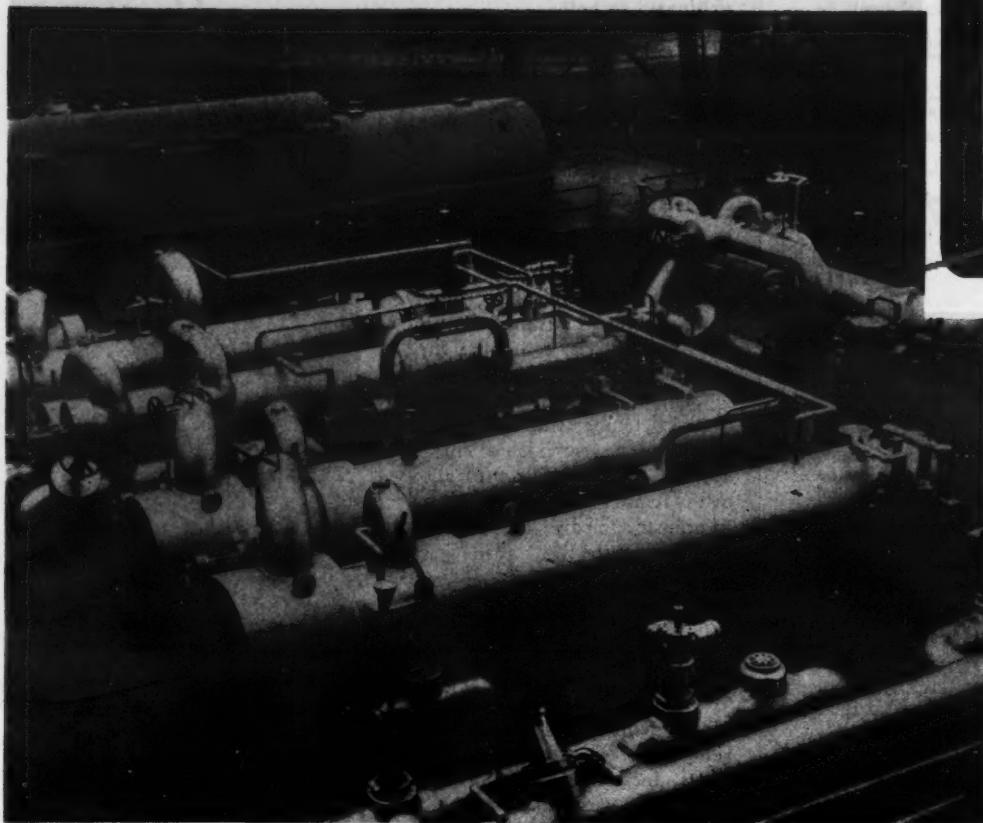
Scale rotates against a fixed index for high readability

brating mechanism permits matching of scale to individual tolerance errors of thermal assemblies. Scale rotates against fixed index pointer, placing all readings in vertical and centered location.

Scale is 12" long. Case is suitable for either flush-panel or surface mounting. Thermo bulbs are copper or stainless. Electrical rating is 115 amp, 115/230 volts AC.

(Type E32N indicating temperature controller is product of United Electric Controls Co., Dept. CP, 85 School St., Watertown, Mass. . . or for more information concerning manufacturer's product, reader may simply check CP 3546 on the Reader Service slip which is located opposite last page.)

One of a series telling how the producing companies of General Precision Equipment Corporation are contributing to America's progress.



Griscom-Russell feed water heaters in a 125,000 KW public-utility power station; save nearly 100 tons of coal per day. Heaters handle flow of water exceeding 2000 G.P.M. at 2500 pounds pressure and steam extracted from the turbine at five different points; "train" of five units pre-heats water fed to boilers from 90°F. to 441°F.



Askania multiple fuel boiler control panel in large steel plant; maintains metered proportion between combustion air and fuels—coke oven gas and fuel oil—for most economical combustion; holds steam pressure constant through all load changes and keeps furnace pressure at a safe and pre-determined value.



GPL ii-TV camera; basic element in the industrial and institutional TV System of General Precision Laboratory. Used to monitor and improve manufacturing processes, view and control dangerous operations, watch over restricted areas.

The highly advanced technological products designed and manufactured by the eighteen producing companies of General Precision Equipment Corporation serve more than a dozen major industries. Products of six of these GPE Companies—Griscom-Russell, Askania, Librascope, Link, Kearfott and General Precision Laboratory—have widespread application in the processing and power industries.

Industrial Processing...and Power

The Griscom-Russell Company is one of the country's largest producers in the fields of heat exchange and water distillation. It is the pioneer in heat exchanger equipment—the key to the whole complex of modern industrial processing and power. For over seventy years, G-R equipment has been responsible for greatly increased efficiency and lowered operating costs in industry.

Askania Regulator Company for a quarter of a century has been a leading developer in the field of regulators and controls, including components and systems. Its products are widely used by the power, steel, gas and coke, mining, chemical, petroleum, glass and paper industries—wherever great reliability and accuracy are essential.

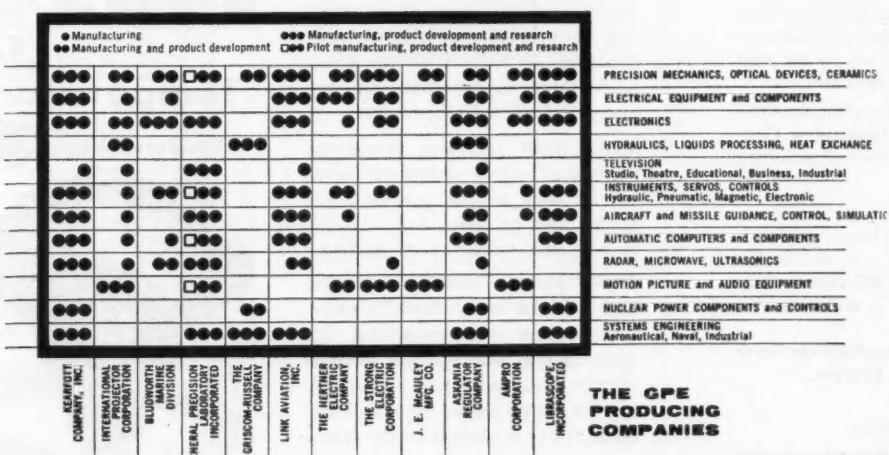
Kearfott Company, Inc.; Librascope, Incorporated; and Link Aviation, Inc. produce a wide variety of precision instruments, computers, servos and other control components for equipment and systems used throughout the power and the processing industries. Industrial television equipment manufactured by General Precision Laboratory Incorporated, the sixth GPE Company active in these fields, is playing increasingly important roles in "seeing eye" monitoring operations in these industries.

Each company in the GPE Group works in specific, highly specialized technical areas, as indicated in the

chart below. Each of these companies, in addition to specializing in its particular products and fields of technical competence, has at its command, as required, the facilities and specialized techniques of the other GPE Companies in their respective fields. Interrelation is achieved through GPE's basic operating policy, Coordinated Precision Technology.

In the fields of research and development, GPE Coordinated Precision Technology permits a high degree of specialization in particular areas of competence and supplements such specialization by the application of techniques in other fields, as desirable. In the field of production, it makes possible a highly flexible application of facilities. This policy has been responsible for a diversified line of precision equipment of superior design and performance, covering a wide range of both standard and special uses.

Perhaps the most conspicuous advantage of GPE Coordinated Precision Technology is that the concept and development of equipment, and of solutions to the underlying technical problems, are not restricted or distorted by traditional allegiance to specialization in a particular field. GPE coordination permits the engineers and technical personnel of each GPE Company to seek the optimum solution for the customer within the total capacities of the GPE Companies as a group.



A brochure relative to GPE Coordinated Precision Technology and the work of the GPE Companies is available. Address your request, or inquiries on specific problems, to:

General Precision Equipment Corporation

92 GOLD STREET, NEW YORK 38, NEW YORK

When inquiring check CP 3547 opposite last page

Gives AC output signal directly proportional to fluid flow . . .

low range flow element meters flows over range from 0.07 to 0.7 gpm

Uses: In laboratory and pilot plant flow measurement and control, ingredient blending systems.

Features: Flow meter measures flow over range from 0.07 to 0.7 gpm with 0.5 per cent accuracy.

Description: An AC output signal is produced by sensing element rotor. Frequency is directly proportional to flow rate. On digital basis, each output pulse produced by element represents a



Tiny sensing element rotor of low range meter is less than $\frac{1}{8}$ " from blade-tip to blade-tip

quantity of 0.00003 gallons. Signal frequency of 60 cps is produced at approximately 0.15 gpm. Standard sensing element housing has $1\frac{1}{2}$ " AN standard male flared tube connectors for inlet and outlet. Standard pipe threads or other end fittings can be supplied. Units are available for operation at temperatures from -300°F to 450°F .

(Flow Sensor meters are product of Potter Aeronautical Co., Dept. CP, Route #22, Union, N.J. . . or check CP 3548 on form opposite last page.)

Suggests applications for pressure cells

Fluid pressure cells and uses in electrical measurement and control of pressure are described in 16-page bulletin. Six standard cells in 25 sizes ranging from 15 to 50,000 psi, as well as some special purpose cells, are included. Characteristics, principles of operation, instrumentation, and specifications are given.

Bul 4306 is issued by Baldwin-Lima-Hamilton Corp., Dept. CP, 940 Simpson St., Philadelphia 42, Pa. When inquiring specify CP 3549 on form opposite last page.

FOUND-

the MISSING LINK in electronic control... the electro-hydraulic FINAL CONTROL element

NEW ASKANIA

ELECTRO-HYDRAULIC VALVE ACTUATOR IS CONTINUOUS-ACTING, DEPENDABLE

• Here's a new valve actuator which makes remote electrical operation of the final control element a reality for the first time. Adaptable to practically all electronic controllers, it produces an accurate, dependable heavy duty action capable of delivering a 600 lb. thrust to slide stem valves up to 8 inch size. Relays and positioners are eliminated because the actuator connects directly to the controller.

SIMPLE OPERATION...

EASY MAINTENANCE

• Operation of the Askania "EHVA" is automatic. Maintenance is less because there are no compressors, dehumidifiers, filters or piping to create trouble.

Trouble sources are greatly minimized... failures seldom encountered...easy to locate and rectify.

ELIMINATES WEATHER FACTOR

• Electrical operation means no inconvenience or failure from condensation or freezing. Trouble free operation under any conditions... indoors or out, winter or summer...is assured—all the way to the final control element with Askania's Electro-Hydraulic Valve Actuator.

Check These Facts: Permits all Electric Control Throughout the System • Weatherproof Performance • Simple to Install—and Operate • Continuously responsive to small signal changes • Accurate Valve Positioning Assured by Force Balance Principle.

FEATURES:

Valve Stem Speed...0.5 in/sec	Valve Stem Thrust...600 lbs.
Valve Stem Stroke.....	1/2 to 2 inches
Input Coil Resistance.....	3,000-18,000 ohms
Input Signal.....	approx. 75 milliwatts d.c.

Write for Bulletin No. 200 for complete information on how "EHVA" control might be adapted to your control system.

CONTROLS FOR INDUSTRY

ASKANIA REGULATOR COMPANY

242 East Ontario Street, Chicago, Illinois

HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS,
ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A Subsidiary of General Precision Equipment Corporation

When inquiring check CP 3550 opposite last page



INSTRUMENTATION

Self-contained timer gives cycle control with pushbutton . . .

includes timer elements, solenoid, signal light in one case

Uses: Automatically controlling process or operation which requires initial manual start, as laboratory or plant sample drying, heating.

Features: Pushbutton is not only used for starting but also for emergency stopping as it opens circuit to solenoid valve.



Covering window protects timer

Description: Electrical timer has automatic reset with solenoid valve, pushbutton station and signal light. Unit has an enclosing window and overlapping style case to protect against dirt and moisture. As exhaust of the solenoid valve is internal, an air purge occurs with operation.

Signal light indicates operating interval of timer. Solenoid valve can be used on air pressures to 50 psi and provides a 3/32" air orifice and rubber seat surface.

Timer pointer travels from set time toward zero, visually indicating time yet remaining in cycle. Timer starts upon release of start pushbutton and continues for set time period. At end of cycle, timer is automatically reset.

(D494A Meritrol Timing Unit is product of Emmett Machine & Manufacturing, Inc., Dept. CP, 445 E. Turkeyfoot Lake Road, Akron 19, Ohio. Check CP 3551 on form opposite last page.)

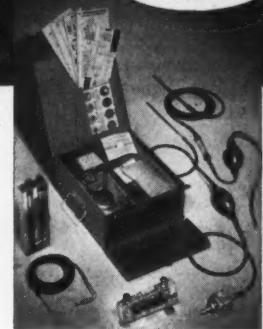
A Complete Combustion Efficiency Test
In 30 Seconds With the NEW, Low-Cost

Dwyer COMBUSTION TEST KIT (No. 1100)

Dwyer
CONTROLS GAGES

- SIMPLE TO USE
- LIFETIME ACCURACY
- PORTABLE
- COMPLETE
- INEXPENSIVE

Includes: Smoke Gage
CO₂ Indicator Slide Rule Computer
Draft Gage* Magneclip
Stack Thermometer Instructions
...and all necessary accessories and fittings



Here's everything you need for a thorough, professional job of combustion testing. This new DWYER Kit simplifies the testing of any installation... residential, commercial or industrial: gas, oil or coal fired. You can perform a complete analysis in less than 30 seconds... accurate to within $\pm 1/2\%$ CO₂.

Handy, handsome metal kit—(also available with CO₂ Indicator alone)—is custom-fitted for all necessary parts and accessories.

*Draft Gage...famous DWYER Inclined Manometer. Continuously indicating type, permanently accurate—choice of ranges: 0 to $1/4$, 0 to $1/2$, or 0 to 1" water.

Write for complete information

F. W. DWYER MFG. CO.

P. O. BOX 373-K • MICHIGAN CITY, INDIANA

When inquiring check CP 3552 opposite last page

Depend on AUTO-LITE

for Temperature Indication

You Benefit from Eye-Level Readings



3-way
adjustable
mounting

Auto-Lite offers many thermometer styles, permitting plant-wide temperature observation at low cost. Standard temperature ranges from minus 60°F to plus 750°F. Send for latest catalog showing various types.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

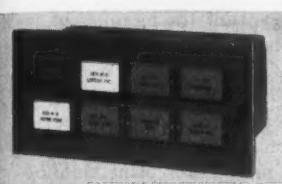
TEMPERATURE INDICATORS & RECORDERS

When inquiring check CP 3553 opposite last page

CHEMICAL PROCESSING

(advertisement)

Panalarm Annunciator Systems
Pinpoint Trouble on
Process Operations and
Automatic Machinery



Panalarm Annunciators are modern working tools used by management concerned with top output from a process or an automatic or semi-automatic machine. They give the operator control over his equipment, enabling him to produce more and better products at a greatly reduced reject rate.

Panalarm Annunciators are coordinated, multiple-unit signal systems that instantly alert the operator to off-normal process conditions at predetermined control points. The signals are both visual (illuminated windows or bullseyes) and audible (horns, bells, etc.). The Panalarm circuit is actuated by the closing or opening of any type of remote switch.

The system is modular, and it is completely flexible in operation and easily modified for future needs. Heavy duty constructions to instrument standards throughout. Completely prewired, simple to install. Panalarm systems are engineered to your specific requirements.

Write for Bulletin 100A

PANALARM DIV., PANELLIT, INC.
7409 North Hamlin Avenue, Skokie, Illinois
Panellit of Canada Ltd., Toronto 14

When inquiring check CP 3554 opposite last page

King MANOMETERS

Every Size — for Every Service

U-Type Manometers

- Single Cleanout
- Single Gland-Packed
- Double Cleanout
- Double Gland-Packed
- High Pressure

- Low in price
- Trouble-free
- Easy to install
- and read

Well-Type Manometers

- Low Well
- Raised Well
- Barometric Reading

- Stay clean longer
- Easy to service

Multi-Tube Manometers

- Multi-Well
- Common-Well
- Special-Purpose

FREE LITERATURE gives sizes, construction and prices. Write today! And ask for informative 12-page Manual on Manometers.

KING ENGINEERING PRODUCTS include King-Gages — Manometers — Self-Closing Push Valves — Pressure Transmitters — Sight Feed Bubblers — Overflow Check Valves — Air-Row Snubbers — Sediment Traps — Moisture Indicators



KING ENGINEERING CORP.
Box 270 • Ann Arbor, Mich.

REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check CP 3555 opposite last page

FEBRUARY, 1956

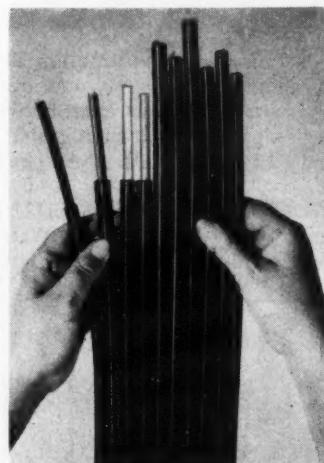
INSTRUMENTATION

**Polyethylene tubing
for instrument
P/T lines**

Uses: Installing instrument lines from process unit to panel board and indicator using normal instrument line pressures and temperatures.

Features: Individual tubes are color-coded.

Description: Ten individual polyethylene tubes are gathered in one "ribbon". Sheath or coating which keeps ten tubes as one is perforated at regular intervals so that individual lines can be "peeled" away from main ribbon without tools. Coating's function is to give assembly its ribbon shape and to afford pro-



Single tubes or groups of tubes may be peeled from ribbon

tection to individual instrument lines. Ribbon is highly resistant to chemicals and moisture, reducing replacement of instrument lines at frequent intervals. All normal instrument line pressures, temperatures can be handled.

Tubes are $\frac{1}{4}$ and $\frac{3}{8}$ " OD with wall thickness of 0.040 and 0.062". Ribbon with ten $\frac{1}{4}$ " OD tubes is $4\frac{1}{8}$ " wide; with $\frac{3}{8}$ " OD tubes, $5\frac{1}{8}$ " wide. Ribbon comes in 500 ft lengths.

(Dekoron "P" Ribbon is product of Dekoron Products Div., Samuel Moore & Co., Dept. CP, Mantua, O. . . or check CP 3556 on form opposite last page.)

THE MARK OF QUALITY



**Wheelco
Instruments**

New
SERIES 8000
**POTENTIOMETER-
RECORDER**

Now available from Wheelco, the Series 8000 Potentiometer-Recorder of null-balancing type, completely self-contained and requiring only an external sensing device. Send for catalog for complete specifications.



FUNCTIONS

Indication • Control • Recording

VARIABLES

Temperature • Pressure • Speed
Strain • Hydrogen Ion (pH)

FEATURES

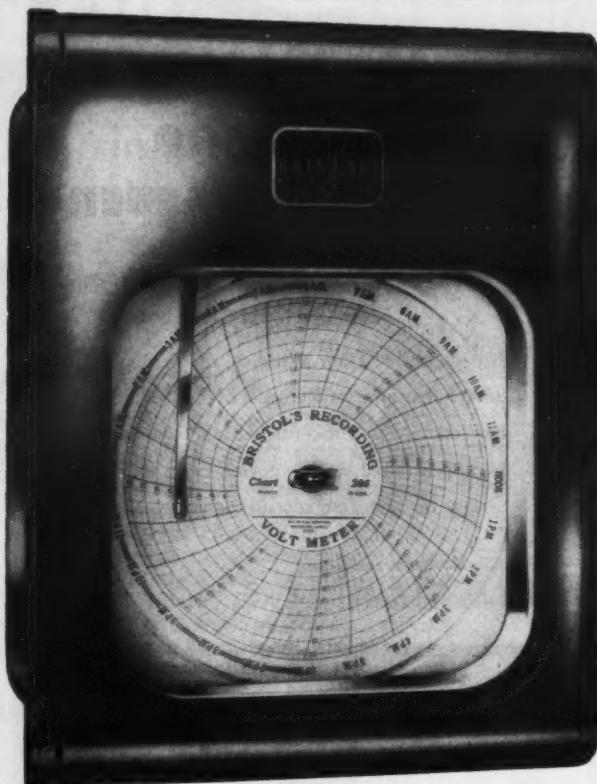
Maximum accuracy • Simplified operation
Minimum maintenance • Plug-in components
Standard electronic tubes
Wide selection of scale ranges

WHEELCO INSTRUMENTS DIVISION
Barber-Colman Company

Dept. B, 1520 Rock Street, Rockford, Illinois
BARBER-COLMAN of CANADA, Ltd., Dept. A, Toronto and Montreal, Canada

When inquiring check CP 3557 opposite last page

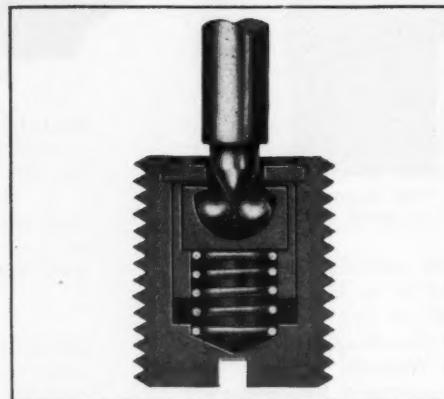
WHAT'S NEWS AT BRISTOL . . .



PERMANENTLY MOUNTED Bristol Voltmeters and Ammeters come in three models: interchangeable surface and flush, surface-panel, and flush panel.



SINGLE AND TWO-PEN PORTABLE BRISTOL RECORDERS are offered in two models: one chiefly for portable pole mounting and the other for general portable service.



NEW BALL-BEARING SUSPENSION, loaded by a coil spring, prevents damage even under severe mechanical shock. Corrosion-resistant stainless steel ball bearings are almost tool-hard.

TRADE MARK
BRISTOL'S
REG. U.S. PAT. OFFICE

POINTS THE WAY IN
HUMAN-ENGINEERED INSTRUMENTATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

When inquiring check CP 3558 opposite last page

How do you pick the right recording ammeter or voltmeter?

The *right* choice for any voltage or current measurement and recording job is a Bristol Series 500 instrument.

Why Bristol? Mainly because for sheer accuracy the Bristol Recorders can't be topped. Among the reasons for that are:

1. Low burden — the lowest burden of any round-chart recorder on the market.
2. Extremely high torque gradient.
3. Temperature compensated.
4. Shock-proof moving element mounting.
5. Leveling of instrument not critical.
6. Continuously legible recording of sudden changes — up to full scale value.

Also, Bristol's Series 500 Voltmeters and Ammeters are designed for easy use, with dust- and moisture-proof cases; quick-set chart hub for each chart changing; and snap-on chart plate.

Models offered that comply with ASA Specification C39.2.

Want more facts? Write for Bulletin E1111 to the Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

5.19

INSTRUMENTATION & CONTROL

Explains human response to vibration

Booklet of 64 pages explains the meaning of vibration terms, describes vibration-measuring instruments, procedures. A short section is devoted to human response to mechanical vibration. Examples of typical vibration measurements are included, including resonant vibration in an engine foundation, vibration in a power plant building, and locating faulty steam traps. Instruments for vibration analysis are also described.

"Measurement of Vibration" is issued by General Radio Co., Dept. CP, 275 Massachusetts Ave., Cambridge 39, Mass. When inquiring specify CP 3559 on form opposite last page.

Gives continuous readings of pressure from 100 mm to 0.001 mm . . .

is self-balancing, direct-reading, hot-wire vacuum gage for one to four stations

Uses: For measuring vacuum on vacuum furnaces, stills, metallizers, dehydration units, other vacuum processing equipment.

Features: Vacuum gage automatically switches from mm range (100 to 0.1 mm Hg) to micron range (100 to 1 μ Hg).

Description: Instrument is a self-balancing, direct-reading, hot-wire vacuum gage. Gage circuit contains a resistance-bridge circuit fed from an 800-cps oscillator. Wire of gage tube forms one



Gage automatically switches from millimeter to micron range of pressure

of the branches of bridge. Bridge is in balance when temperature wire is about 120°C. Any change of pressure in tube will cause change of wire temperature and wire resistance. Bridge is thus unbalanced. Bridge output is fed to an amplifier

INSTRUMENTATION & CONTROL

which through a feedback loop returns the bridge towards balance, and wire temperature to original value. Bridge voltage, after rectification, is fed to indicating meter, a microammeter.

Four gage tubes may be connected to gage circuit. Selector switch on front panel connects either tube to bridge circuit. Relay circuit for automatic range selection has extra outlet for connecting external relay.

Instrument will operate from 110 to 240v AC. Dimensions are $1\frac{1}{4} \times 6\frac{3}{4} \times 8\frac{1}{2}$ ".

(Autovac is product of Consolidated Engineering Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena 15, Calif. . . . or for more information check CP 3560 on convenient form which is located opposite last page.)

Summarizes company's line of control components

Booklet of 24 pages on products and services of manufacturer includes description of company's components for control systems. Ring balance instruments are also described. Short descriptions of chemical products for boiler water and steam conditioning are included.

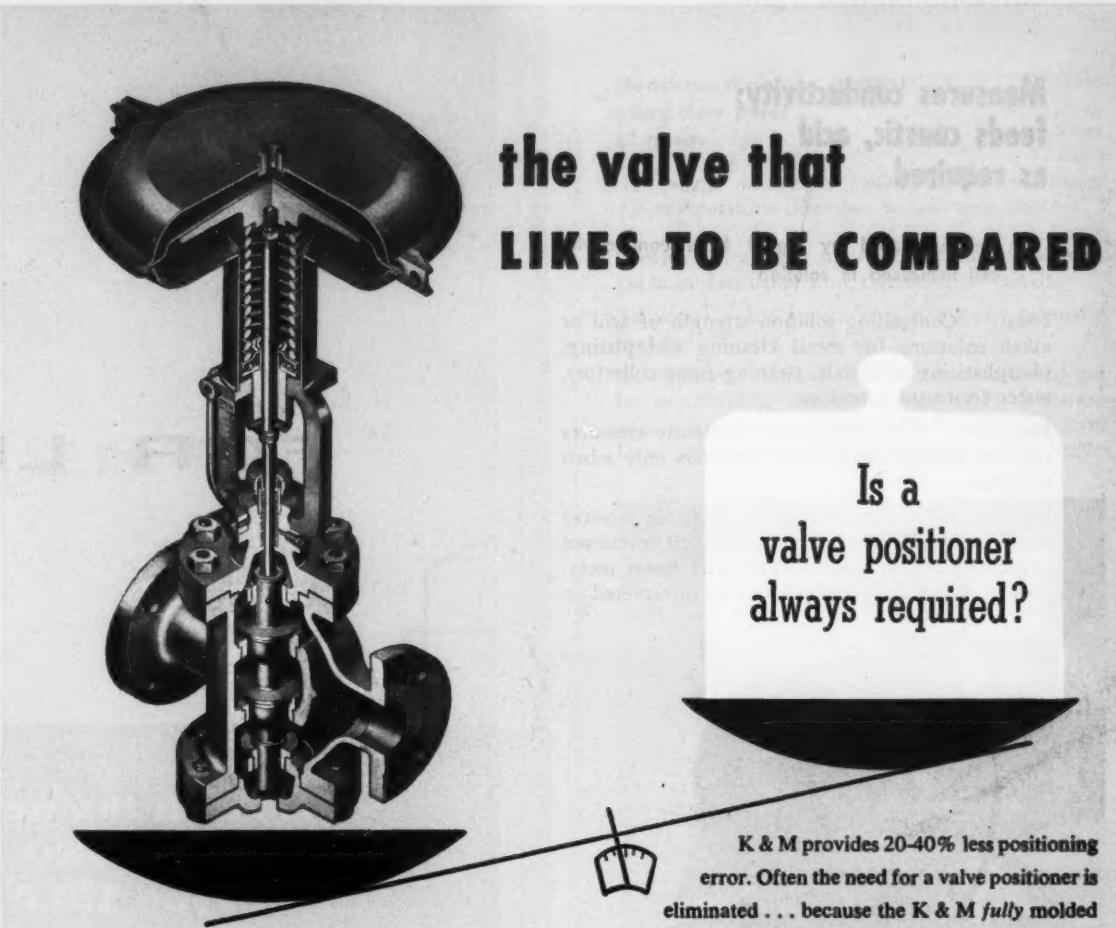
Bul GSP-901 is issued by The Hagan Corp., Dept. CP, 323 Fourth Ave., Pittsburgh 30, Pa. When inquiring about manufacturer's product reader may simply check CP 3561 opposite last page.



Pressure Switch

... operates at pressures to 100 psi. Measuring only $1\frac{3}{4} \times 2\frac{1}{16}$ " high (shown here slightly larger), switch is available in single and double terminal models. Spring loaded diaphragm can be equipped with damping device for overload protection.

(Pressure switch is a development of Rochester Manufacturing Co., Dept. CP, 86 Rockwood St., Rochester 10, N.Y. . . . or check CP 3562.)



the valve that LIKES TO BE COMPARED

Is a valve positioner always required?



K & M provides 20-40% less positioning error. Often the need for a valve positioner is eliminated . . . because the K & M *fully molded* diaphragm gives the most constant effective diaphragm area.

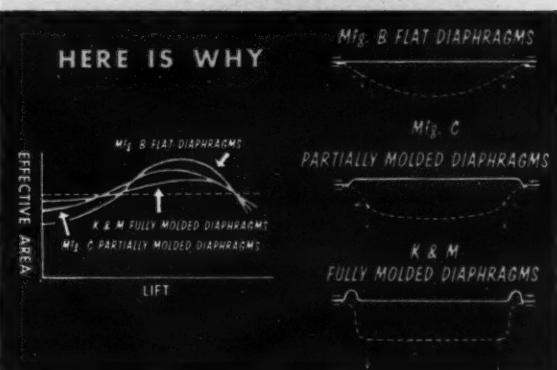
K & M precision positioning also derives from long stem travel . . . lift that equals or exceeds any comparable valve . . . plus the highest power factor in the industry.

Behind it all lies one fact: K & M Control Valves are not *adapted* to high lift, they are *designed* for it. Throughout the entire range of valve travel . . . positioning is accurate and undistorted . . . control increments are finer with minimized positioning error.

Write for the K & M Valve Data Catalog.

Bulletin CV-53.

77th Anniversary . . . Oldest U. S. Pressure and Level Control Valve Manufacturer



With K & M *fully molded* diaphragms, virtually all components of force are vertical. Added to this, K & M gives the highest power factor (diaphragm area x lift) for precise valve positioning.

diaphragm control valves

KIELEY & MUELLER, INC.
64 GENUNG STREET, MIDDLETOWN, NEW YORK



When inquiring check CP 3563 opposite last page

**Measures conductivity;
feeds caustic, acid
as required**

Unit activated by signal from conductivity cell immersed in solution

Uses: Controlling solution strength of acid or alkali solutions for metal cleaning and plating, phosphatizing of metals, cleaning fume collectors, water treatment processes.

Features: Conductivity cell constantly measures solution strength and feeds chemicals only when required.

Description: Electronic control circuit receives electrical signal from conductivity cell immersed in solution vat or tank. Conductivity meter measures in milliamperes, which can be interpreted in



Electrode cell is at lower left. Feeder chemicals are placed in hopper on unit and fed into solution according to conductivity measurement

oz/gal or per cent concentration. Feeder unit is actuated by control circuit whenever solution strength falls below pre-determined level. Either acid or alkali solution is then fed from hopper. Unit is constructed of stainless steel. Electrode cell is stainless steel and polyethylene.

(Conductivity controller is product of The Diversey Corporation, Dept. CP, 1820 Roscoe St., Chicago 13, Ill. . . or for more information check CP 3564 which is located on convenient Reader Service slip opposite last page.)

NEW SIMPLICITY

FOR LIQUID LEVEL M

... with the new
FOXBORO
Type 13LA
pneumatic
LEVEL
TRANSMITTER



LEVEL MEASUREMENT!

Easy Low-Cost Installation on any closed or open tank. Only two small pressure taps required. Nothing inside tank!

Fully-Adjustable Ranges . . . 0-20" to 0-80" and 0-50" to 0-250" H₂O.

Complete adjustment for elimination of outside leg effect gives forward-reading signal to any standard receiver!

Highest Sustained Accuracy . . . instant, precise response to level changes even under extreme operating conditions.

Rugged and Corrosion-Resistant . . . Level-sensing element is Type 316 stainless steel, silicone-filled "capsule" diaphragm applicable on static pressures up to 1500 lbs.

There's nothing simpler for accurately measuring liquid level than the Foxboro Type 13LA d/p Cell* Liquid Level Transmitter! No floats, knife edges, stuffing boxes, or complicated hook-ups. A simple, direct piping job connects it to the tank . . . operates in any position, even upside down. The Transmitter precisely measures difference in head caused by level change . . . sends 3-15 psi air signal over single air line to indicator, recorder, or controller. It's easily traced when required,

up to 250°F., to maintain fluidity of liquid.

The 13LA d/p Cell Transmitter is low in initial cost, requires practically no maintenance. In addition, it is easily converted in field for the measurement of fluid flow. It's the ideal instrument for heavy industrial applications . . . indoors or out. For complete details, ask your nearest Foxboro Sales Engineer, or write for new Bulletin 13-22 to The Foxboro Company, 812 Neponset Ave., Foxboro, Mass., U.S.A.

*Reg. U. S. Pat. Off.

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

FOXBORO
REG. U. S. PAT. OFF.
LIQUID LEVEL TRANSMITTER

When inquiring check CP 3565 opposite last page

**Measures moisture content
using dew point
of gases . . .**

mirror surface is cooled until dew forms; temperature describes water-vapor content

Uses: Measuring moisture content of gases in gas manufacturing, heat treatment of metals.

Features: Instrument is portable and manually operated. Weight is 16 lb.

Description: Indicator measures moisture of gas by determining temperature at which moisture begins to condense upon cooled mirror surface. Dew point temperature directly describes water



Dewpoint indicator is portable

vapor content of a gas. Indicator gives readings over range of temperatures from ambient to -100°F. Unit requires no electrical outlet, operating upon a self-contained battery. Tester can be used to measure different gases in succession.

(Dewpoint indicator is product of General Electric Company, Dept. CP, One River Rd., Schenectady 5, N.Y. Check CP 3566 on form opposite last page.)

**Has moisture-vapor chart
for compressed air**

Featuring a moisture-vapor content chart to evaluate water vapor in a compressed air system, four-page bulletin describes manufacturer's dehydrators and filters for compressed air.

Bul M-7155 is issued by Hankison Corp., Dept. CP, 141 Biltmore Bldg., 951 Banksville Road, Pittsburgh 16, Pa. Specify CP 3567 opp. last page.

**Describes all-bronze meters
for special uses**

In two colors, eight-page bulletin describes manufacturer's line of all-bronze meters. Instruments are recommended for metering alcohols, brine, water, ketones, organic esters, some mild acids, some beverages, sugar solutions, and syrups. Accessories for meters are also described.

Bul OG409 is issued by Meter & Valve Div., Rockwell Mfg. Co., Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. When inquiring specify CP 3568 on form opposite last page.

**Controls process temperature
to 1% of scale
of 1 μ amp . . .**

temperature indicating contact controller automatically controls temperatures to 2500°F

Uses: Indicating and controlling temperature, both straight cut-off and simple on-off control, for industrial furnaces, ovens, tanks, similar equipment.

Features: Controller-indicator operates on a current of less than 1 μ amp, causing control contacts to have exceptionally long life.

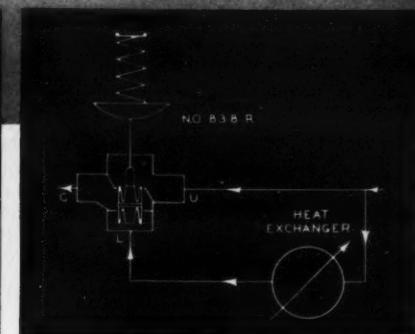
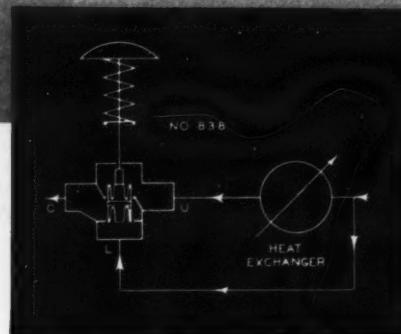
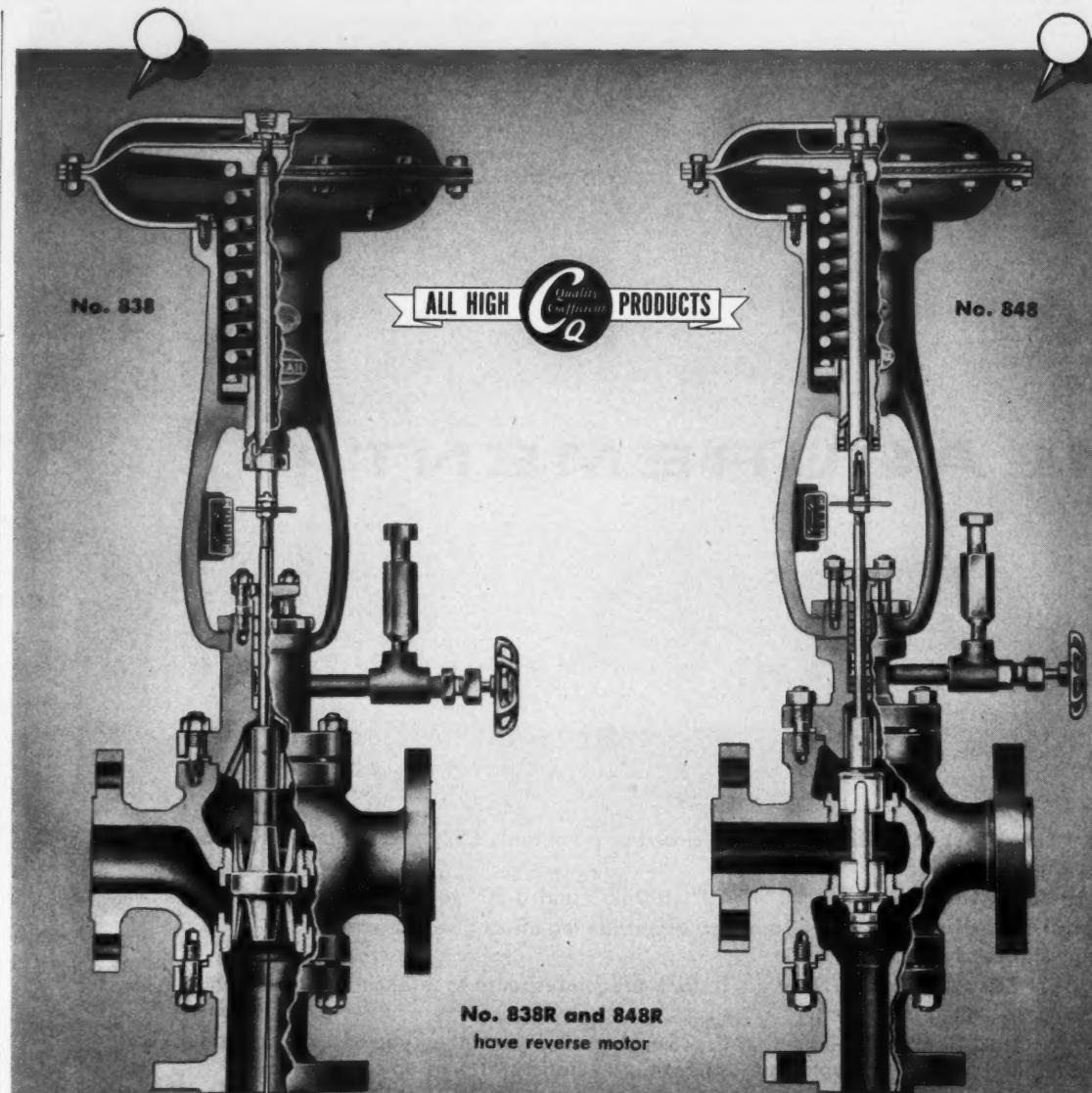
Description: Instrument consists of two separate units housed together in a single case. Pyrometer unit indicates temperature under control. Electronic control unit opens and closes load relay regulating fuel supply to controlled process.

Temperature-setting pointer with three contact fingers is moved by panel dial to scale point of desired temperature. Process temperature is registered by indicating pointer of a thermocouple-actuated millivolt meter accurate to $\pm 2\%$ of scale. When process temperature rises to pre-set control point, indicating pointer makes contact with setting pointer and control action starts. Input impedance is changed; primary relay in plate circuit of vacuum tube releases its armature; load relay drops out, shutting off process fuel supply.

When process temperature drops below control



Temperature-setting pointer gives temperature control reading



Combining Service

In these typical applications of Masoneilan 3-way valves, No. 838 and 838R (above) are installed downstream of a heat exchanger for combining service; and No. 848 and 848R (shown on next page) are installed upstream for diverting service. In combining, the heating medium is brought in through ports U and L and out through common port C. In diverting, the fluid is brought in through port C and out through ports U and L.

Select **Masoneilan 3-Way Control Valves to get...**

Stability and Flexibility In Combining or Diverting Service

Choice of seating arrangement permits installation to obtain the inherent stability (and maximum allowable pressure drop) of flow tending to open both ports. No. 838 and 838R use a single seated body and a plug with seats back to back *inside* the seat rings. No. 848 and 848R use a modified double seated body and a plug with seats face to face *outside* the seat rings. Plugs are *top* and skirt guided for more accurate alignment and long service life.

Choice of motors permits obtaining maximum operating force, with same available thrust at both ends of the stroke or with a high thrust in one direction if desirable. 3-15 or 6-30 psi spring ranges and availability of oversize diaphragm cases allow a wide selection of motors, either direct or reverse. Enables you to choose, also, the action providing greatest safety factor in the event of air failure.

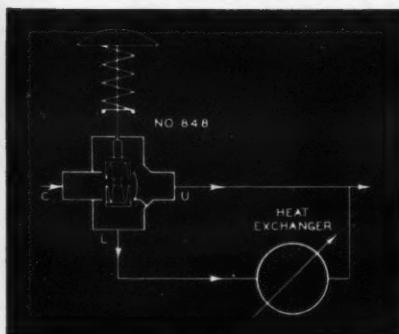
A more detailed discussion of these valves is available. Write our office nearest you, or

**MASON - NEILAN
REGULATOR CO.**

1203 ADAMS STREET, BOSTON 24, MASS., U. S. A.



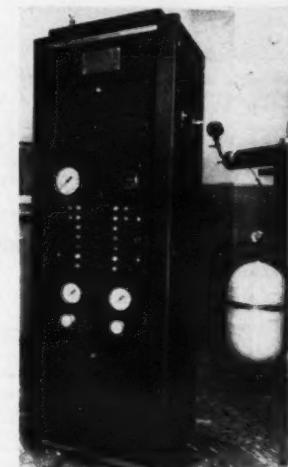
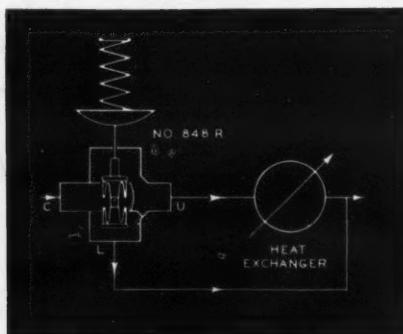
Sales Office or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa • Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco • Boise • Louisville • Salt Lake City • El Paso • Albuquerque • Odessa • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham • New Orleans • Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto



Diverting Service

Since maximum unbalance occurs across the bypass port, motor action is normally selected so that an increase in diaphragm pressure will tend to close the bypass port. The flow direction shown in all these diagrams tends to open both ports and maximum motor operating force is available to overcome off-balance. The valves are arranged so that the heating medium to the exchanger will be shut off in the event of air failure.

When inquiring check CP 3569 opposite last page



Metal cabinet encloses high-pressure pump

point, control action reverses and turns process fuel supply back on. Control band width is 1% of scale or less.

Size of instrument case is 6 x 7 3/8 x 5 5/8". Five ranges are available: 0 to 600°, 1000°, 1500°, 2000° and 2500°F.

(AIC Indicator/Controller, Model PB, is a product of Automation Instrument Corp., Dept. CP, 1516 Summer St., Philadelphia 2, Pa. . . or for more information check CP 3570 on form opposite last page.)

**Maintains constant flow
at extreme pressures
to 10,000 psi . . .**

two double-acting hydraulic cylinders assure discharge at constant rate of flow

Uses: Provides smooth delivery of fluids at constant flow under high pressures.

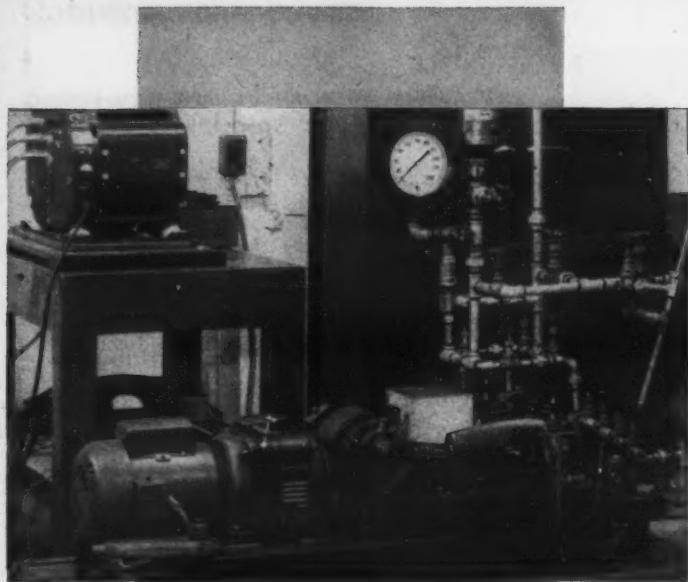
Features: Flow pump is capable of operating under pressure to 10,000 psi.

Description: Air pressure operates high-pressure discharge valves and hydraulic driving pump which operates two double-acting hydraulic cylinders.

Action of cylinders is controlled by servo valves. While one cylinder is delivering at a constant rate, second cylinder is being filled. Filling process takes place faster than discharge rate to allow smooth, continuous pump action. Electronic release actuates second cylinder into forward motion as first cylinder nears end of its stroke. Electronic interlock balances discharge pressure of one cylinder with the other.

Pump can be operated either manually or automatically. Flow rates range from 10 to 600 cc/hr. Pump materials are Monel or stainless steel. Unit is enclosed in metal cabinet 67 x 22 x 18". Controls are on front panel.

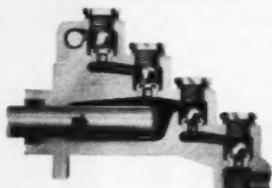
(Model 155 pump is product of Exline Engineering Company, 1636 East 6th St., Tulsa, Oklahoma . . . or for more information check CP 3571 on form opposite last page.)



Standard motor-driven Controlled Volume Pump being tested for accuracy by independent research organization. For details of test procedures and results, write for Technical Paper No. 55-1-1.

Required accuracy for metering process additives

Exclusive Milton Roy STEP-VALVE LIQUID END



Double ball checks, sloping passages and absence of air pockets assure highest possible volumetric efficiency. Should a solid particle lodge under one suction ball, for example, second suction ball will seat on discharge stroke, thereby preventing fluid from being pumped into suction piping.

THE INHERENT accuracy (within \pm one percent) of Milton Roy Controlled Volume Pumps can solve your chemical metering problem. As flow controllers, these units simultaneously meter and pump process fluids. As ratio controllers, they maintain a fixed relationship between additives and process streams. As final control elements they contribute to accurate regulation of pH and other process variables.

There is a Milton Roy Controlled Volume Pump or chemical feed system for practically every chemical metering need. Capacities range from 3 milliliters per hour to 45 gallons per minute, with flexible adaptations for manual or automatic control of pump capacity. Pressures up to 50,000 psi.

Write for application data contained in the bulletins listed below. One of these will probably suggest the simple, economical solution to your chemical metering problem.

Bulletin 455 "Controlled Volume Pumps in Paper Making"
Bulletin 953 "Controlled Volume Pumps in Industrial Water Treating"

Bulletin 1253 "Controlled Volume Pumps in Process Instrumentation."

Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Phila. 18, Pa.



Engineering Representatives in the United States, Canada, Mexico, Europe, Asia, South America and Africa.

When inquiring check CP 3572 opposite last page

INSTRUMENTATION & CONTROL

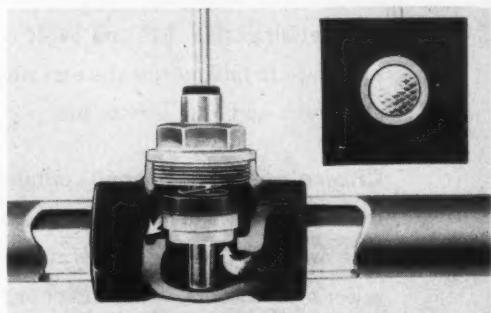
Will actuate a switch If flow fails . . .

indicates flow — or lack of it — and operates a pilot light, horn or other warning signal

Uses: Signals flow stoppages of liquids through pipelines and operates auxiliary warning units.

Features: Switch unit is corrosion resistant and explosion-proof.

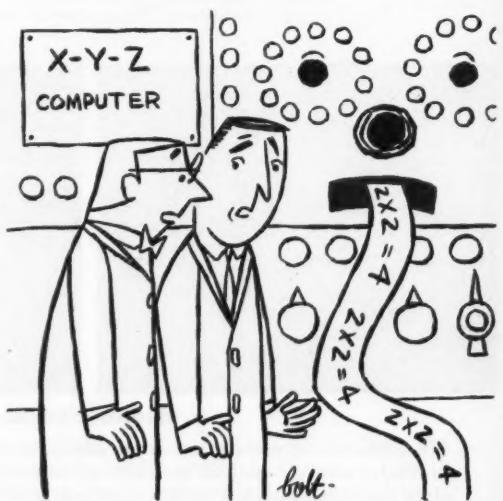
Description: Indicator functions with any flow over 1½ gpm. Unit can be installed in any pipe line since the body of the indicator is a standard



Flow—or lack of it—actuates indicator

fitting. Flow indicators now in production accommodate standard pipe sizes from $\frac{1}{4}$ to 3". Unit is constructed of marine bronze and plastic.

(Flow indicator is product of Gems Company, Dept. CP, 64 Welles Drive, Newington, Conn. Check CP 3573 opposite last page.)



"What'll we do if writing it a thousand times doesn't fix it?"

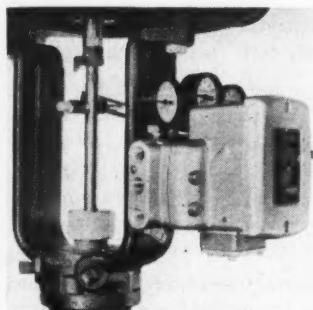
INSTRUMENTATION

**Controls valve action
and mounts directly
on valve body**

Uses: Overcoming friction and reducing line effects in processes where controller-to-valve distances are long.

Features: Valve positioner is compact and mounts directly on valve yoke. Field adjustment permits valve sequencing.

Description: Unit receives a controller output signal at a spring-opposed bellows which governs a flapper-nozzle relation-



Valve positioner acts through lever connected to stem

ship. Back pressure in nozzle circuit acts on high-capacity air-relay to vary supply pressure to valve motor. Full pressure can be applied to motor on controller output change of less than 2" of water. As valve stem moves to its correct position, a lever connected to the stem restores flapper-nozzle balance.

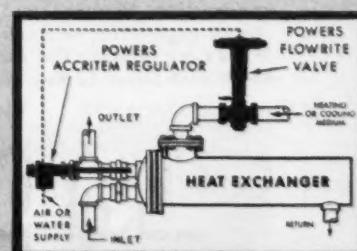
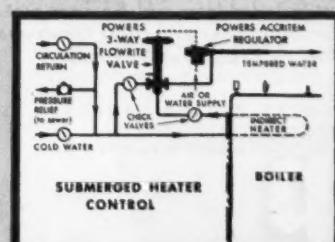
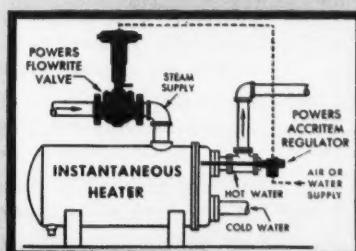
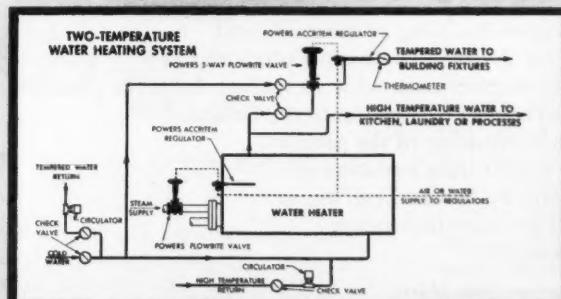
Positioner is $6\frac{3}{8} \times 6\frac{1}{4} \times 5\frac{5}{16}$. Unit can be adapted to either air-to-lift or air-to-lower diaphragm motor. Three gages and bypass manifold aid start-up and maintenance procedures. A plain manifold is optional.

(Vernier Valvactor is product of The Foxboro Company, Dept. CP, 86 Neponset Ave., Foxboro, Mass. Check CP 3574 opposite last page.)

For more information on product at right, specify CP 3575 . . . see information request blank opposite last page.



VALVES: Available in a variety of body types and inner valves.



Want control for Water Heaters, Heat Exchangers, Processes?

call **POWERS**

You Will Insure Better Temperature Control IF—

 you use the right type regulator and proper size control valve. Whether a simple self-operating regulator shown at left is required or the air-operated controls featured here . . . you can get both types and others from Powers. For further information call or write our nearest office.

Powers ACCRITEM Temperature Regulator and FLOWRITE Valve—the right combination for many control problems where pressure and load conditions fluctuate widely, also for control of large size valves.



Over
50 Years
Experience
making this
type of
regulators

Ranges
50 to 250°F—150 to 350°F

ACCRITEM TEMPERATURE REGULATOR

Gives Close Control and Years of Dependable Service.

- Has Adjustable Throttling Range and Calibrated Dial.
- Simple, Durable Construction assures years of trouble-free service.
- Easy to Install • Direct or Reverse Acting, reversible on the job.
- Small Size: Regulator head is 2 1/2" wide, 3 1/2" high, bulb is 17" long with 1/2" IPS Connection.

Fully Described in Bulletin 316. Write for a copy.

THE POWERS REGULATOR COMPANY

Skokie, Ill. • Offices in Chief Cities in U.S.A.
Also Canada and Mexico • See your phone book

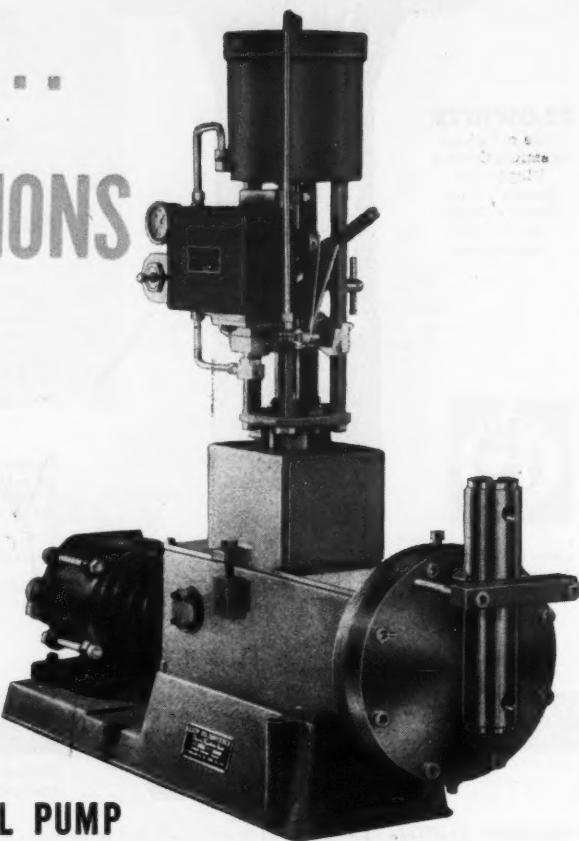
IT PUMPS...

IT METERS...

IT PROPORTIONS

IT FEEDS...

**WITHOUT LEAKAGE OR
CONTAMINATION**



Lapp PULSAFEEDER CONTROLLED-VOLUME CHEMICAL PUMP

If your process requirements demand accurate handling of corrosive and non-corrosive liquids, here is the pump for the job. The Lapp Pulsafeeder is a piston-diaphragm pump... it has positive displacement with no stuffing box. The product being pumped is isolated from the drive mechanism by a hydraulically balanced diaphragm, thus preventing leakage or contamination of the product. Pumping speed is constant; variable flow results from variation in piston-stroke length... controlled manually by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 484 Wilson Street, Le Roy, N. Y.

Lapp

When inquiring check CP 3576 opposite last page

INSTRUMENTATION & CONTROL

Describes small-size gages for draft, pressure

Bulletin of 12 pages describes manufacturer's line of small-size receivers and draft, pressure, temperature gages. Gages are called the V-5 Series.

Bul 806 is issued by Republic Flow Meters Co., Dept. CP, 2240 Diversey Parkway, Chicago 47, Ill. When inquiring specify CP 3577 on form opposite last page.

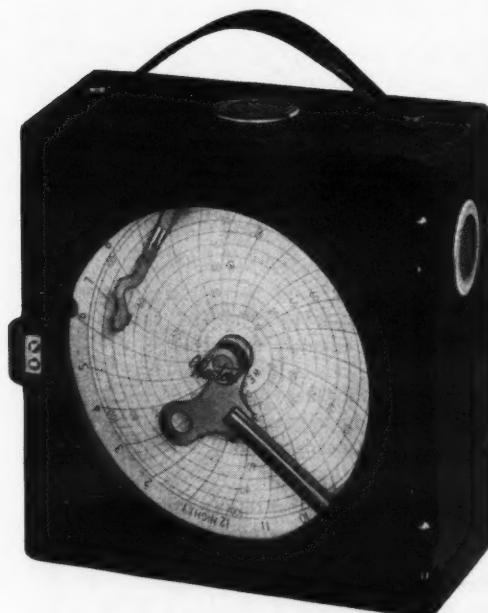
Measures, records temperatures over operating range from -40 to 140°F...

miniature temperature recorder is portable and allows fast, easy range changing

Uses: Measuring and recording temperatures from -40 to 140°F in refrigerated trucks, trailers, railroad cars, mechanical refrigerating units, laboratories.

Features: Temperature range changes are quickly and easily made by inserting required chart and adjusting unit with a screwdriver.

Description: Recorder is entirely self-contained and is unaffected by atmospheric pressures. Measur-



Easily-portable recorder weighs 3 1/2 lb

ing element is a strip of bimetal wound into a helix. Pen operates directly from movement of bi-metal helix. No multiplying levers are used. Ventilators at top and at both sides of recorder give air circulation.

... makes
AUTOMATION
Safely
AUTOMATIC

Teledyne
BONDED STRAIN GAGE
ELECTRICAL
PRESSURE TRANSMITTER



Has many applications
in processing indus-
tries, 15 ranges up to
10,000 P.S.I.

Wherever high pressures are involved in automatic processes, there can always be an explosion hazard. Wherever this is true, the Teledyne will transmit pressure information to protected locations. The Teledyne is highly accurate and extremely durable. Bonded strain gage construction makes the Teledyne insensitive to vibration. Among its other features are high frequency response, linear output over full pressure range, and stainless steel pressure chamber for handling corrosives (including fuming nitric acid). Easily disassembled for clean-out and repairs.

PLEASE NOTE: Contact us for calibration service on Pressure Transducers, 0 to 25,000 P.S.I.

Write for Illustrated Literature



**TABER INSTRUMENT
CORPORATION**
SECTION 46
111 Goundry St., N. Tonawanda, N. Y.

When inquiring check CP 3578
opposite last page

INSTRUMENTATION & CONTROL

Seven charts cover ranges from -40 to 140°F. Duration can be either seven day or 24 hr. Sensing elements are calibrated for either 50° or 100°F differentials in overall range span of -40 to 140°F. Instrument weighs 3 1/2 lb. Size is 5 3/4 x 5 3/4 x 3 1/4". Chart drive is spring-wound.

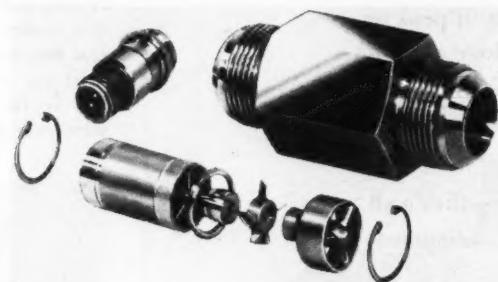
(Model 8465 temperature recorder is product of Weston Electrical Instrument Corporation, Dept. CP, 614 Frelinghuysen Ave., Newark 5, New Jersey . . . or check CP 3579 opposite last page.)

**Measures rate of flow
up to 100,000 lb/hr
using rotor**

Uses: Measuring rate of flow up to 210 gpm where accuracy of $\pm \frac{1}{2}$ of 1% is required.

Features: Turbine meter has range of 20:1. Accuracy is not affected by piping configuration.

Description: Meter consists of a fluid-driven rotor mounted in a short housing installed in pipeline. Rotor turns at a speed directly proportional to fluid velocity. Blades of rotor are of magnetic material. As each blade passes a pickup coil containing a magnet an electrical pulse is induced in coil. Number of pulses produced is directly proportional to speed of blade rotation and number of blades.



Turbine meters flow by inducing electrical pulse in pickup coil

Pulse frequency of output may be converted to DC voltage linearly proportional to input. Indicating potentiometer can be used to translate voltage level to true rate indication.

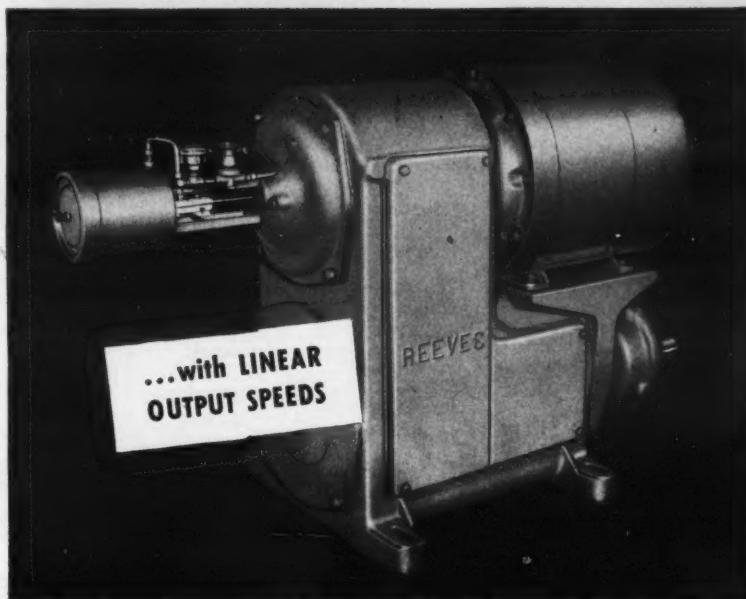
Specific gravity corrections are fed manually into potentiometer so that indicated flow rate can be in mass flow units, as pounds per hour.

An events per unit time counter may be connected directly or through a preamplifier for digital readout of total number of pulses.

Flowmeter is available in standard sizes of 1/2, 3/4, 1, 1 1/2, and 2"; max capacities from 9 to 210 gpm.

(Turbine Flow Meter is product of Fischer & Porter Co., Dept. CP, Jacksonville Road, Hatboro, Pa. Check CP 3580 opposite last page.)

New Automatic Speed Control for Continuous Processing



REEVES

Auto-Pneumatic Control

Now with the REEVES Vari-Speed Motodrive equipped with the new sensitive Auto-Pneumatic control, you can automatically control continuous processes involving the regulation of heat, liquid level, pressure, temperature, flow, and many other variables. Positive, direct connection from the pneumatic instrument to the Auto-Pneumatic control assures accurate and sensitive speed regulation.

Exclusive REEVES cam design provides linear output speeds so necessary for delicate proportioning processes . . . maintains the greatest accuracy while regulating or maintaining any speed throughout the range of the Motodrive.

REEVES Auto-Pneumatic Control assures maximum efficiency and economy in industrial processes . . . means outstanding savings for you in material, fuel and labor costs plus continuous uniformity of your product or process. Write today for complete information.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Division of Reliance Electric and Engineering Co.

Send today for
BULLETIN CP13d-M542



When inquiring check CP 3581 opposite last page



It's in the Bag!

Fresh, Clean Ink for a Year of Trouble-free Recording

★ You won't have any messy, time-consuming re-inking of pens on the new Bailey Recorders. The entire system is white-glove clean—hermetically sealed, non-evaporating, non-corrosive. Gone is any chance of sludge or oxide formation. Gone are clogged pens, interrupted records, unsightly splashes.

The transparent plastic ink sacs are changed once a year—that's all. Capillary tubing carries fresh, clean ink to the pens continuously without any day-to-day attention.

This exclusive new inking system* is only one of the many time-saving, money-saving distinctive features of the new Bailey Recorder.

Ask for Product Specification E12-5.

PB4-1

*Now available for the New Bailey Recorder only.



ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER

- Pre-calibrated plug-in receiver units
- Up to four pneumatic or electronic receivers—or two receivers and two integrators
- Any four variables on one chart—easily read and interpreted
- A full year's ink supply at one loading
- Faster ordering—from stock
- Minimum inventory of parts
- Minimum instrument investment for process cycle expansion or alteration

BAILEY
METER COMPANY
1074 IVANHOE ROAD
CLEVELAND 10, OHIO
Controls for Power and Process

When inquiring check CP 3582 opposite last page

INSTRUMENTATION & CONTROL

Outlines variable-speed control for fractional-hp motors

Booklet of eight pages in two colors describes manufacturer's line of variable-speed drives using fractional-hp motors from $\frac{1}{4}$ to $1\frac{1}{2}$ hp. Features of drive are stepless instant starting, no electronic components, 50:1 speed range with good regulation and response, compact design. Units are designed for installation without special tools or wiring.

Bul S580-5-55 is issued by Magnetic Amplifiers, Inc., Dept. CP, 632 Tinton Ave., New York 55, N.Y. Specify CP 3583 opposite last page.

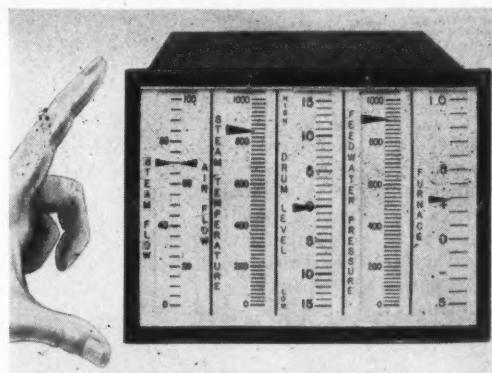
Allows compact grouping of instruments on panel . . .

complete line of pneumatic receivers and gages for draft, pressure, temperature reduced in size

Uses: For more compact instrument panel boards which use pneumatic receivers and gages for draft, temperature and pressure.

Features: Scales are only five inches high but are easy to read, even from a distance.

Description: Complete line of small-size receivers and gages includes differential pressure unit that makes a direct measurement of draft, vacuum and low positive pressures. A bellows unit can be used for direct measurement of pressure to 100 psi or for receiving standard pneumatic transmission pressures.



Scales are only five inches high but are easy to read

Each gage or receiver is an independent, self-contained unit which may be grouped together with as many as eight other units in a single case or mounted separately. Units can be removed, adjusted or replaced without disturbing others in same case.

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INSTRUMENTATION & CONTROL

Full sized diaphragm, bellows and helix elements are used for accuracy and dependability. Illuminated scales are standard. Bulbs can be replaced without removing the gage from its case. Duplex units with two pointers are available.

(V5 Series receivers and gages are product of Republic Flow Meters Company, Dept. CP, 2240 Diversey Parkway, Chicago 47, Illinois . . . or for more information check CP 3584 on form opposite last page.)

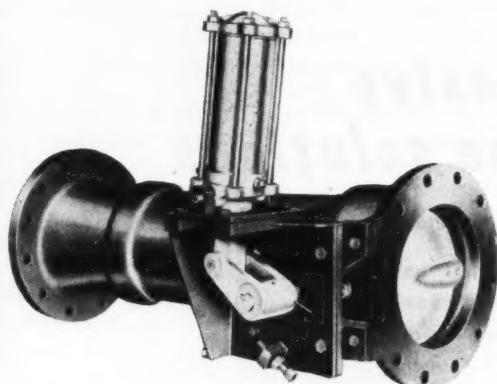
Controls rate of flow with accuracy of $\pm 3\%$. . .

has cast iron body for working pressures up to 125 psi, bronze-lined throat section

Uses: As power-actuated rate of flow controller for water, waste, or other industrial plant materials.

Features: Controller has accuracy within $\pm 3\%$ within the range from 25 to 100% of maximum capacity.

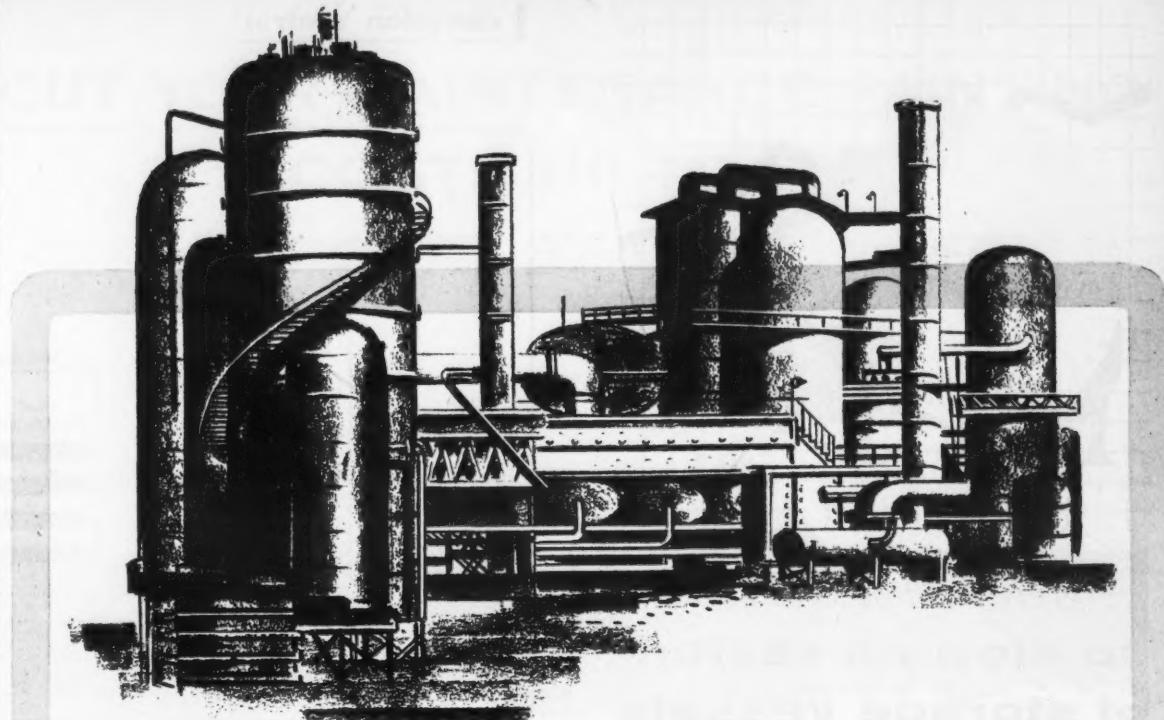
Description: Controller is composed of a Venturi metering section and pressure recovery section, power-actuated valve mechanism, and a pneumatic, hydraulic, or electric positioning control unit. Body is cast iron for working pressures



Control unit for Venturi metering section can be pneumatic, hydraulic, or electric

up to 125 psi. Unit has pressure-averaging annulus at inlet and closed annular chamber with multiple vents at throat. Venturi throat section is bronze-lined. Butterfly valve is rubber-seated.

(Model RCB-T is product of Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, R. I. . . . or for more information about manufacturer's product, reader may simply check CP 3585 on Reader Service slip which is located opposite last page.)



FOR VITAL FLOW CONTROL

WHETHER you're developing a new process or modernizing an old one—investigate the unique characteristics of the bearingless Pottermeter.

This electronic flowmeter—easily installed in any type of piping to operate at any angle, at any pressure and at temperatures from -450 to $+1200^{\circ}\text{F}$. measures flow of any liquid with an accuracy of $\pm \frac{1}{2}$ of 1%.

Pottermeters are available to measure flows as low as 0.07 GPM or as high as 3,000 GPM. The inherently linear output of the Pottermeter makes it ideal for systems to control either flow rate or total flow.

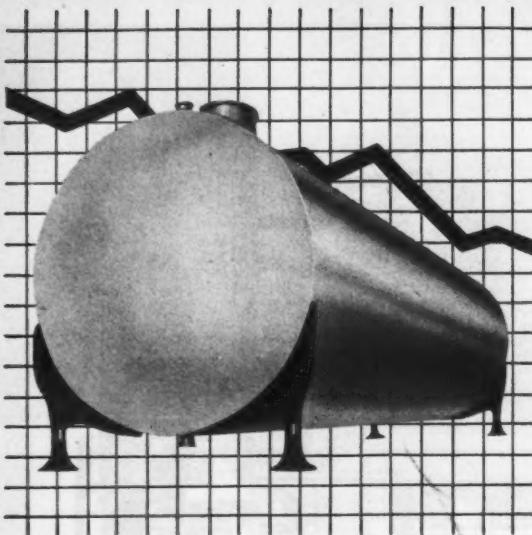


Find out how the bearingless "floating rotor" used in the Pottermeter can give you more precise flow measurement, longer trouble-free service life, and more accurate flow control.

Write for Bulletin PS-1

Potter **POTTER AERONAUTICAL COMPANY**
Route 22 • Union, New Jersey • Phone MUrdock 6-3010
Makers of "Potter Engineered" products

When inquiring check CP 3586 opposite last page



Here's a low-cost way to stop corrosion of storage vessels

Storing corrosive acids (or protecting sensitive and/or expensive solvents against metallic contamination) need not cost you a fortune for dependable storage vessels.

Sure, there is a wide choice of materials from which you can build storage vessels. But on a cost-service basis you just can't beat Pfaudler Glassed Steel Chemstor® Vessels.

Now let's examine that. First, both glass and steel are low-cost materials. Second, fusing the glass to steel storage vessels is not expensive. Result, a durable glassed steel vessel—at very reasonable cost.

Add corrosion resistance and you've got something. Two types of glass are applied, Pfaudler 28T, good for corrosives in tanks up to 15,000 gallons; the other, Pfaudler 28, for mild service—such as phenol, alcohol, formaldehyde, etc., for tanks up to 35,000 gallons.

What about cost? You can buy Chemstor vessels from 25c to \$1.00 per gallon, depending on size. This does give you a way to stop corrosion of storage at low cost. For complete specifications, send for Bulletin 918.

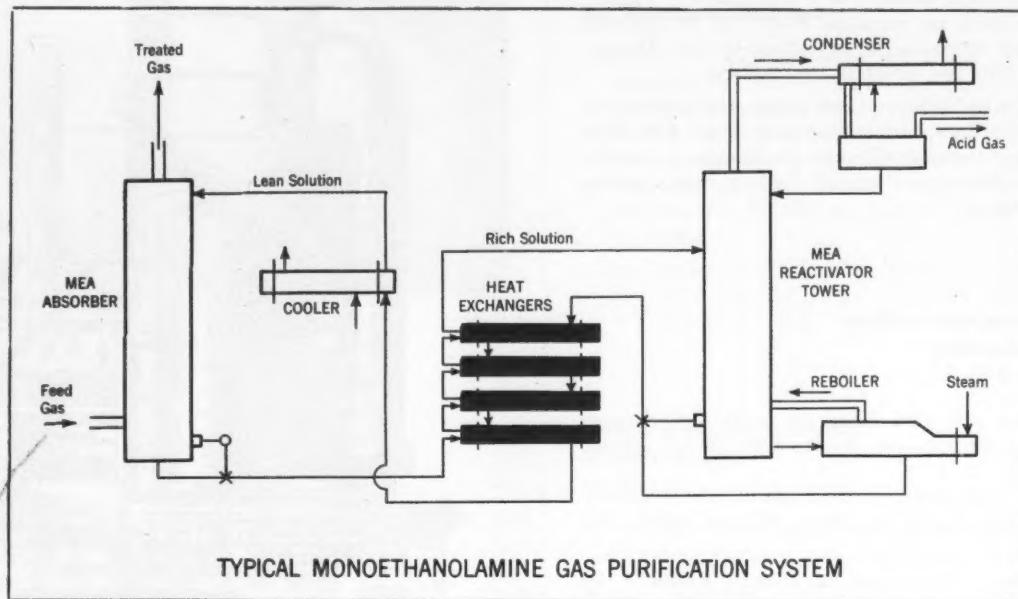
Pfaudler



THE PFAUDLER CO., Dept. CP-2, Rochester 3, N. Y.

When inquiring check CP 3587 opposite last page

corrosion control



While tubes in former heat exchangers failed in a few months, units made from impervious graphite, showing no effects from exposure after two years service, satisfactorily —

resist corrosive monoethanolamine solutions

Present system used by major producer of organic chemicals provides the required heat transfer with only 17% of the effective area of former bundles

Problem: Metal tubes of a heat exchanger used in a monoethanolamine system by a major producer of organic chemicals failed within about three months and the unit had to be replaced after only six months.

Equipment originally installed in process included four solution heat exchangers in series provided with low carbon steel tubes. Tube side of exchangers is subjected to a carbon dioxide-rich aqueous monoethanolamine solution at a temperature of about 120°C. Shell side is subjected to a denuded aqueous monoethanolamine solution at a

maximum temperature of about 130°C.

Initial failure in three months occurred in the hottest exchanger. Since original equipment wasn't satisfactory, company changed over to a corrosion-resistant metal which they felt would resist the effect of the liquids. Corrosion-resistant metal tubes used to rebuild bundle also began to fail within five months and bundle was removed for retubing in another 14 months. Corrosion-resistant metal was again used for retubing. Within four months these tubes began to fail, and in another nine months it was obvious that the tube bundle

you can

CUT YOUR MAINTENANCE PAINTING COSTS UP TO 50% with AMERCOAT 87 VINYL MASTIC

Complete Protection in a Single Coat-10 Mils Thick

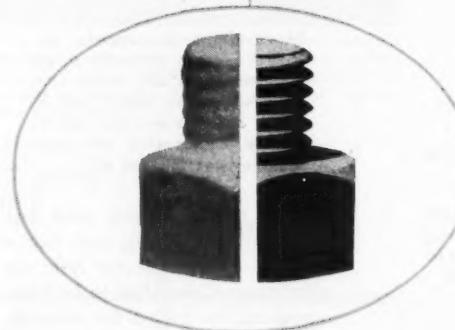
HERE IS HOW THIS REMARKABLE PROTECTIVE COATING CAN SAVE YOU MONEY:

1. Only one cross spray coat over a primed surface is required for complete protection—this means lower labor costs.
2. Fewer scaffolding and rigging shifts are required.
3. Less down time—dries to touch in minutes, eliminates the risk of contamination between coats.
4. Greater thickness means longer life—lower cost per square foot per year.

Amercoat 87's thixotropic characteristic helps provide extra thickness on sharp edges and irregular surfaces; it is non-porous and will not crack or check.

Amercoat 87 combines the time-tested chemical and weather resistance of vinyl coatings with the thickness of conventional mastics, yet is easily applied with standard industrial spray equipment.

We will be pleased to send you our technical bulletin describing this coating in detail.



Amercoat
CORPORATION

DEPT. PB. 4809 FIRESTONE BOULEVARD, SOUTH GATE, CALIFORNIA Evanston, Ill. • Kenilworth, N.J. • Jacksonville, Fla. • Houston, Tex.

When inquiring check CP 3590 opposite last page

would not last much longer in this service.

Solution: Four standard Karbate impervious graphite heat exchangers were placed in service. Impervious graphite is resistant to practically all corrosives at temperatures up to 170°C. It withstands thermal shock and can be used at pressures up to 75 psig.

Since the impervious graphite used has excellent thermal conductivity, only 360 sq ft of total heat transfer service for the four heat exchangers was required, compared to 2100 sq ft in the original exchangers. Present units each have 31 $\frac{1}{8}$ " ID x 1 $\frac{1}{4}$ " OD impervious graphite tubes assembled between sheets made of the same material. Shell consists of a 10" steel pipe.

Since fluid on tube side contacts only impervious graphite throughout exchanger, units were installed so that carbon dioxide-rich monoethanolamine solution passes through four heat exchangers in series on tube side. Denuded monoethanolamine passes countercurrently, but in parallel, through shell side of two banks of two heat exchangers arranged in series. This flow arrangement is desirable because of low available pressure drop on shell side.

Results: After two years of service, impervious graphite heat exchangers show no effects from exposure to corrosive carbon dioxide-rich monoethanolamine solution.

In comparing temperatures of solutions entering and leaving both shell side and tube side of original heat exchangers with those of replacement units, very little difference was noted. This indicates that the impervious graphite exchangers are providing the required heat transfer even though they have only 17% of the effective area of former units. Measured heat transfer coefficients of present units range from 409 to 778 Btu/hr/sq ft/°F.

(Karbate impervious graphite heat exchangers are a product of National Carbon Company, div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check CP 3588 on form which is located opposite last page.)

Hard-surfacing alloys resist corrosion

Ten-page publication describes hard-surfacing alloys which have excellent resistance to corrosion. Materials consist of alloy-filled tubes, in coils for automatic welding, or cut to length for manual application.

"Hard-Surfacing Alloys" is issued by Coast Metals, Inc., Dept. CP, Little Ferry, N.J. When inquiring specify CP 3589 on form opposite last page.

TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe $\frac{1}{2}$ " to 6". Bulletin 80.



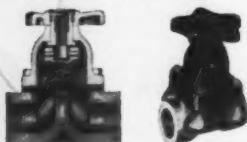
ACE offers 100 years experience to

STOP CONTAMINATION

To prevent discoloration, taste, odor or metallic pick-up in your processes, you'll find the best, most economical piping, pumps, valves and tanks among the many ACE rubber and plastic materials. Wide range of temperatures, pressure, impact resistance. Phone nearest American Hard Rubber Company distributor, or write for Technical Data CE-50.

VALVES

for all-plastic piping systems



Trouble-free plastic diaphragm valves . . . choice of general-purpose ACE-ITE, ACE PARIAN (polyethylene) or ACE SARAN. Handles most corrosive chemicals and food ingredients. Sizes $\frac{1}{2}$ " to 2", 50 psi. at 77 deg. F. Bulletins 80 and 351.



RIGID VINYL . . . STRONG, AGE-PROOF

ACE RIVICLOR is a new rigid threaded plastic pipe with good aging and high impact strength. Not affected by most inorganic acids and alkalis, also excellent for many organics. Sizes $\frac{1}{2}$ " to 4". Ask for Bulletin CE-56.



1001 USES for ACE-FLEX Tubing

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. $\frac{1}{8}$ " to 1" ID. Bul. 66.

CORROSION

Cupro nickel tubing eliminates binding of heaters

Tubing cold-drawn from 30% cupro nickel is being used for sheaths in cartridge heating units to prevent the units from binding in holes through which they are inserted when the heat is turned on. Cupro nickel remains bright and clean, even at the top operating temperature of 1200°F. This metal is also corrosion-resistant to glue, water, and other materials commonly heated with cartridge units.

Heating units are inserted in holes which are drilled and reamed in heating dies, platens, process machinery, molds, melting pots and other equipment. Thermal expansion



Shown (top) is complete cartridge heating unit with sheath fabricated from 30% nickel. Lower photo shows sheath cut to length and with one end spun to provide an opening just large enough for lead exit

sion of metal formerly used was such that the heating unit had a tendency to bind in the hole. In some cases it even had to be hammered out or drilled for removal. Cupro nickel meets the application satisfactorily.

(Cupro nickel tubing is product of Superior Tube Co., Dept. CP, 1571 Germantown Rd., Norristown, Pa. Check CP 3592 opposite last page.)

(Cartridge heating units are product of Ogden Mfg. Co., Dept. CP, 4006 N. Campbell Ave., Chicago 18, Ill. Check CP 3593 opp. last page.)

Want to forget about rust for 20 years?



"Metallize 'em and forget 'em!"

Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without any further maintenance.

These unique coatings are mechanically bonded to the surface-adhesion is not dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is positive. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

the Metco* Systems

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The Metco Systems provide for standardization of surface preparation, coating thicknesses and organic overcoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.

See other examples of metallizing in Sweet's File for Plant Engineers Section 7a/Me

Metallizing Engineering Co., Inc.

1143 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A. WATSON METALLIZING ENGINEERING CO., INC.

1143 Prospect Ave., Westbury, Long Island, N. Y.

- Please send me, without obligation, Bulletin 62-B.
- Please have Metco Field Engineer call.

NAME _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

When inquiring check CP 3594 opposite last page

CHEMICAL PROCESSING



processing equipment of rubber and plastics

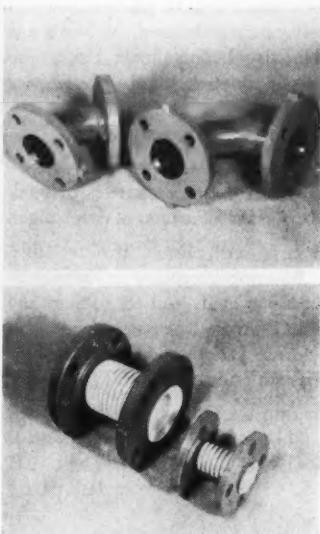
AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check CP 3591 opposite last page

Two additional products available from inert fluorocarbon resins . . .

Tee pipe elbow, molded bellows can be furnished

Tee pipe elbow and molded bellows are two products recently made available from chemically inert fluorocarbon resins. Products are suitable for applications involving acids and caustics, hot lacquers, steam, oils, and other materials under extreme conditions of temperature.



Fluorocarbon resin elbows (top) and bellows (bottom) are chemically inert

Tee pipe elbow of short radius construction is available in both 45 and 90° types. Bellows and expansion joint is available in 1, 1 1/2, 2, and 3" diameters. Custom fabricated designs and shapes may also be ordered.

(Fluorocarbon products can be obtained from Resistoflex Corp., Dept. CP, 39 Plansen St., Belleville, N.J. . . or for more information check CP 3595 on form opposite last page.)

For more information on product at right, specify CP 3596 . . . see information request blank opposite last page.

CUT PIPING COSTS

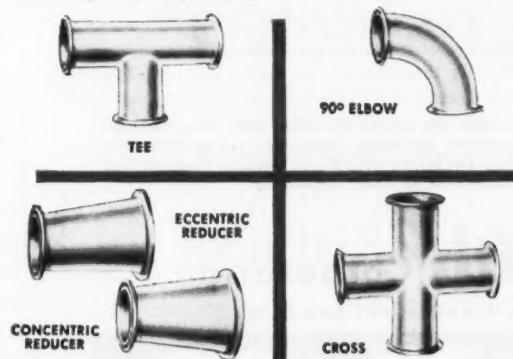
... with the NEW TRI-CLAMP

Schedule 5 and Tube O.D.

STAINLESS STEEL
INDUSTRIAL FITTINGS



SCHEDULE FIVE Tri-Clamp Fittings are available in all standard types, in sizes from 1" through 24". Tube O.D. Tri-Clamp Fittings are available from 1 1/2" through 4". Fittings are fabricated of type 304 and 316 stainless steel, and sizes through 4" are annealed, pickled and passivated.



Simple Rugged Construction Assures Fast Positive Leak-Tight Joints

1. RETAINER SECTIONS grip flanged ferrules securely, assures proper alignment.
2. TENSION BAND equalizes pressure around joint, holds clamp in position for quick connection.
3. TRUNNION is of simple design, provides fast locking and unlocking action.
4. "T" LATCH assembly easily snaps into position in Coupler (6) and is held in position by tightening nut (5).
5. TENSION NUT, easily tightened with ordinary hex wrench.
6. COUPLER SEAT, holds Latch securely in place to complete positive, leak-tight joint.



As illustrated, the TRI-CLAMP Joint consists of a flange type ferrule—a special precision molded gasket which fits into the grooved ferrule lip—and the TRI-CLAMP itself, which is composed of a specially fabricated spring clamp which grips the ferrule edges, and a simple, bolt-type coupler assembly firmly secured to the clamp ring . . . always in position for instant assembly or disassembly.

All that is necessary for installation is to attach the ferrules to stainless steel tubing or pipe, insert gasket into position, slip TRI-CLAMP over ferrules and gasket and tighten into closed position—to produce a positive, leak-tight joint.

TRI-CLAMP Stainless Steel Fittings offer an entirely new concept of fitting design and fabrication, offering much greater speed and ease of installation, together with appreciable savings in original investment cost, and longer trouble-free life for many types of corrosion-resistant liquid conveying line service.

See your nearest Tri-Clover distributor, or write:

1355-R

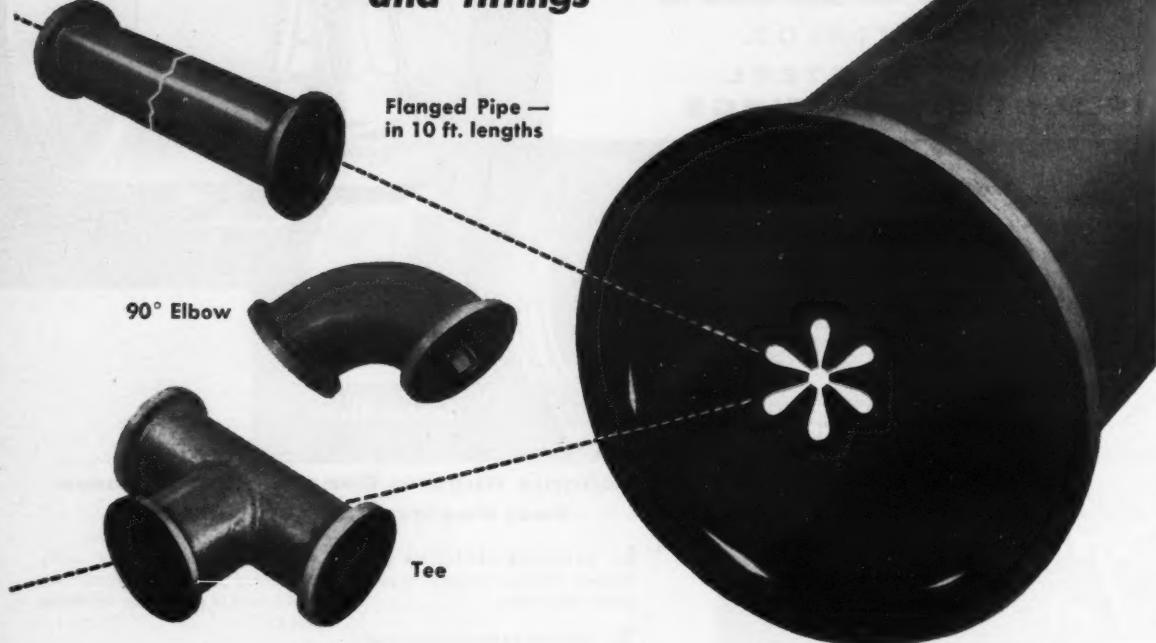
LADISH CO.

Tri-Clover Division
Kenosha Wisconsin

YOU SAVE 3-WAYS

with **Glascote glass-lined pipe** *

and fittings



Ultimate in corrosion resistance... zero contamination with leak-proof joints... lower costs thru longer service life

Glascote glass-lined pipe and fittings are the solution for moving acids or alkali and other corrosive materials. Made with the same precision and quality control used on other Glascote products. Glass linings are applied in successive applications and thoroughly inspected and tested for trouble-free operation. Glascote pipe is highly effective in use with any materials normally processed in glass-lined containers.

Glascote[®]

PRODUCTS, INC.

CLEVELAND 17, OHIO

Sales offices or agents in Principal Cities

Export Sales:

A. O. Smith Corp., International Division, Milwaukee 1, Wisconsin

Leak-proof gaskets are available to suit materials conveyed in the pipe. What's more installation can be made without special tools. Maintenance can be performed by your own personnel.

Glascote produces and maintains a stock of glass-lined pipe in 10-foot lengths and fittings ranging in inside diameters from 1½ to 4 inches. (6-, 8-inch and larger sizes are fabricated to order.)

Efficient, corrosion-resistant Heat Exchangers may be assembled from lengths of jacketed pipe. The use of either elbows or return bends provides a versatile operating assembly.

Ask the representative who calls on you for all the facts about Glascote products — reactors, receivers, condensers, evaporators, storage tanks and accessory products. Or, if you prefer, write direct. Glascote Products, Inc., Cleveland 17, a subsidiary of A. O. Smith Corporation.

A subsidiary of A.O.Smith Corporation
World's largest manufacturer of glass-lined steel products



When inquiring check CP 3597 opposite last page

CORROSION CONTROL

Epoxy resin material is suitable for severe corrosive service

Valves, pumps, tanks, heat exchangers of product are available

Excellent corrosion resistance to a wide variety of chemicals is provided by dark green modified epoxy resin material which serves as an armored plastic for use in chemical processing equipment. Valves, tanks, and processing equipment can be completely fabricated from the material or it can be used to serve as an armor for wetted portions of pumps and valves. Manufacturer is producing a line of pumps in which the armored plastic is extensively used. Valves made with the material can also be obtained.

One interesting piece of processing equipment in which the material is used is heat exchanger which is presently available. These units combine the excellent corrosion resistance of tantalum which is used for tubes, with corrosion-resistant properties of modified epoxy used for other portions of exchanger.

Two types of the armored plastic are available. Durcon 1 exhibits superior corrosion resistance to hydrofluoric and fluosilicic acids and to sodium and potassium hydroxides. Durcon 2 possesses equal or better resistance to a wide variety of other corrosives. The latter material has superior mechanical properties.

(For further information on Durcon armored plastic and valves, pumps, tanks, and heat exchangers made from it contact the Duriron Co., Inc., Dept. CP, Dayton, Ohio. Check CP 3598 opposite last page.)

Formulation makes polyethylene crack-resistant . . .

advantageous for tubing, other flexing uses

Uses: For industrial feed lines, gaskets, and other items where conventional flexible polyethylene could not be used up to now. It is suitable for polyethylene tubing and applications where it is subject to flexing, vibration or where it is attached to fittings with an interference fit.

Features: Improvements in formulation of material make it suitable for a wider variety of uses.

Description: Crack-resistant polyethylene is extruded to specifications in tubular, rod, or strip form as well as in shapes of almost any configuration.

(Aeroflex P crack-resistant polyethylene is product of Anchor Plastics Company Inc., Dept. CP, 36-36 36th Street, Long Island City 6, N.Y. . . . check CP 3599 on form opposite last page.)

CORROSION CONTROL

Satisfactory corrosion resistance indicated for Mn-Cr-N stainless steel . . .

recently developed austenitic alloy contains little or no nickel.

Although sufficient data has not been obtained on corrosion and high temperature properties of a recently developed stainless steel as yet, data that are available indicate that these properties will be satisfactory. The recently developed Mn-Cr-N stainless steel was developed with the aim of conserving nickel since little or no nickel is present in the alloy.

More nitrogen is used in the nickel-free and low nickel stainless steels than was thought possible prior to the study. Nitrogen content can be made more than double the former limit. This austenitic stainless steel will be suitable for special fields of application and not merely as a substitute for presently used grades during period of nickel shortage.

(Mn-Cr-N stainless steel is product of United States Steel Corp., Dept. CP, 208 S. LaSalle St., Chicago 90, Ill. . . . or for more information about manufacturer's product reader may simply check CP 3600 on the convenient Reader Service slip which is located opposite last page.)



Cold flow resistance of TEFLON* and reinforced TEFLON (DUROID 5600) was tested at 700° F., under a torque of 35 pounds and a flange pressure of 1,000 p.s.i. After 2 hours the flanges were cooled and the bolts retightened. The flanges were then exposed to the heat for another 2 hours. Results are as pictured. The gasket of TEFLON (left) extruded extensively on all edges and lost all bolt torque. DUROID 5600 did not extrude and retained 15 pounds bolt torque, demonstrating significantly improved resistance to cold flow.

Greater Resistance to Heat Distortion



TEFLON (left) distorted badly when subjected to 720° F. and then cooled. Reinforced **TEFLON** (**DUROID 5600**) exposed simultaneously to the same temperature retained flatness, demonstrating greater dimensional stability at high temperatures.

SOME IMPORTANT TEST VALUES

Tensile Strength, MD, psi	2500
Tensile Strength, CMD, psi	1500
Compressibility, 5000 psi, %	8
Thermal Expansion Coefficient per °F., 73-140°F.	2.7×10^{-5}
Heat Distortion Temperature, °F.	
66 psi	500+
264 psi	500+
Deformation under Load, %	
1200 psi	2*
2000 psi	3*
Coefficient of friction against polished steel, static	.21
kinetic	.14
Specific Gravity	1.90

*Made up of actual flow and also of compression under load. Data to indicate breakdown between these two portions is being obtained.

ROGERS REINFORCES "TEFLON" TO REDUCE ITS COLD FLOW

Rogers DUROID 5600 is a combination of TEFILON and inert fibers, blended into an homogeneous sheet material. This new material is not a replacement or a substitute for TEFILON, but rather an extension of it. TEFILON has better electrical characteristics and dry lubricating qualities. DUROID 5600, however, has much of TEFILON'S resistance to chemicals, and is greatly superior to TEFILON in resistance to cold flow and heat distortion.

*Registered trademark of DuPont Company for its tetrafluoroethylene resin.

Please write

Dept. C

for Technical Bulletin

ROGERS CORPORATION

ROGERS, CONNECTICUT

PRODUCTS

DUROIDS—for Gaskets, Filters, Electronic Devices, etc.
SHOE MATERIALS—for Counters, Midsoles, Liners, etc.
ELECTRICAL INSULATION—for Motors, Transformers, Generators, etc.
PLASTICS—Special Purpose Molding Compounds and Laminates.

SERVICES

DEVELOPMENT—Research and Engineering of New Materials, Parts, and Products.

FABRICATING—Including Combining, Coating and Embossing.



When inquiring check CP 3602 opposite last page

A "cushioned" porcelain-to-porcelain seal in the Lapp Valve

The chemical resistance qualities of the Lapp Valve come from the fact that the body and plug are both *solid porcelain*. Porcelain, as a material, however, has little resiliency or "give" when the plug hits the seat in the body. Special spring-loaded "cushion" seating in Lapp valves prevents damage from a heavy-handed operator, and warns when seal is tight. Built into the thrust bushing of every Lapp Y-valve and angle valve, is an arrangement of tempered Beryllium copper spring washers. This spring loading also provides that a closed valve will maintain its tightness even under vibration and thermal movement of parts.



V-valves, angle valves, flush valves, safety valves, and plug cocks of Lapp Porcelain have standard bolt-circle flanges for easy connection to all piping and equipment. Write for bulletin with complete description, characteristics, and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 438 Wendell St., LeRoy, N. Y.

When inquiring check CP 3603 opposite last page



CORROSION CONTROL

Guide to selection of stainless steel

Data provided in chart form serve as a general guide in the selection of stainless steel. Covering all standard types, data sheet provides information on chemical composition, structure, and general characteristics.

AISI chart can be obtained from American Iron and Steel Institute, Dept. CP, 350 Fifth Ave., New York, N.Y. When inquiring specify CP 3604 on form opposite last page.

Handles corrosive exhaust — also high temperature, explosive fumes . . .

fan designed for difficult air moving jobs

Uses: Exhausting corrosive, high temperature, and explosive fumes or for other applications involving difficult air moving jobs.

Features: Integrally-rolled mounting flanges and a continuous welded seam on fan drum eliminate fume or condensate leakage and subsequent corrosion. Motor mount assembly is drilled to accommodate any motor from $\frac{1}{4}$ to 5 horsepower.



Fan features 12-gage steel drum and belt housing with continuous welded seam

Propellers are cast from an aluminum-magnesium alloy for greater strength, stability and corrosion resistance. Special corrosion-resistant coatings for fan are factory applied when specified.

Description: Fan drum and belt housing are formed from 12-gage steel plate. A rigid, one-piece cast-iron housing isolates fan bearings from air stream. Three bearing assembly designs are available: totally enclosed, ventilated, and corrosion resistant. Fans have air delivery ratings to 26,000 cfm in five sizes from 16 through 36".

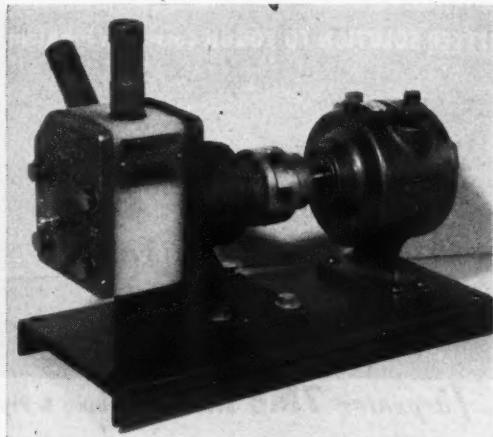
(Propellair tubeaxial fans are a product of Propellair Division of Robbins and Myers, Inc., Dept. CP, Springfield, O. Check CP 3605 opp. last page.)

Corrosive liquids handled safely with portable air-driven chemical pump ...

unit is self-priming and explosion-proof

Uses: For handling most acids, alkalis, solvents, pharmaceuticals, and a wide variety of similar products where corrosion, abrasion, or contamination is a problem.

Features: Where safety in handling hazardous liquids is a prime consideration, this unit offers completely explosion-proof design, as well as a total elimination of stuffing box or mechanical seal leakage.



Chemical pump has reversal feature, allowing it to be operated in either direction

Description: Use of an airmotor provides a wide range of variable-speed operations. By means of a simple valve control, a variable rate of fluid flow can be obtained. Unit is portable and can be operated in either direction. Pump is furnished in plastic, rubber, or stainless steel construction, depending on the application. Capacities range up to 20 gpm and pressure to 50 psi.

(Airmotor driven pump is product of Vanton Pump & Equipment Corp., Dept. CP, 201 Sweetland Ave., Hillside, N. J. . . or for more information check CP 3606 opposite last page.)



Painting, courtesy Power Magazine

New J-M Color Code →
identifies metal in Spirotallic® Gaskets

Most engineers know that Spirotallic Gaskets maintain a perfect seal despite extreme fluctuation in fluid pressure and flange compression. Consequently, these gaskets are used in a wide range of service conditions which include high temperatures, elevated pressures and active corrosives. To withstand these conditions, Spirotallic Gaskets employ a variety of corrosion-resistant alloys.

Because so many of these metals look alike, only expensive tests or costly experience with the gasket could determine the gasket metal used, once its identifying tag was lost. Now the color patch on the centering guide tells the metal employed

and saves time, trouble and expense. This new method of identification also makes it easier for storekeepers and mechanics who handle the gasket. In addition, it simplifies inventories.

Spirotallic Gaskets hold their seal because they are made of spirally wound interlocking plies of asbestos and spring-like metal strip. These gaskets compress easily with light bolting. For catalog PK-35A and copy of color code card write Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.



Here are seven of the metals available and their color identifications



Johns-Manville SPIROTALlic GASKETS

When inquiring check CP 3607 opposite last page

TANTALUM...

there are many kinds of "costs"

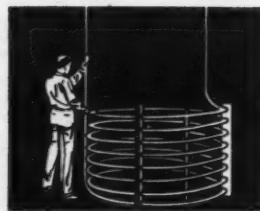
...but only one true COST

The cost of chemical processing equipment can be measured by the pound, by the square foot, by the unit, or by other yardsticks. Only one cost, however, is truly significant or all inclusive: the equipment cost per pound or ton of product per year.

Tantalum, being immune and not merely "resistant" to acid attack, is an attractive material of construction from an over-all cost standpoint. Properly used, it eliminates corrosion, product contamination, undesirable side reactions; it also decreases down time and maintenance costs. It has excellent heat transfer properties and is not damaged by thermal shock. It is light in weight, easily installed, requires no elaborate framework.

For low over-all costs in process equipment, look into Tantalum. The experience of Fansteel engineers will be a valuable supplement to your own technical staff.

USE TANTALUM WITH ECONOMY for most acid solutions and corrosive gases or vapors, except HF, strong alkalis or substances containing free SO₃.



Write for free **TANTALUM** booklet today!

FANSTEEL METALLURGICAL CORPORATION
NORTH CHICAGO, ILLINOIS, U.S.A.

G564A

When inquiring check CP 3608 opposite last page

CORROSION

Fuming nitric acid handled by filter . . .

has woven Teflon cloth filter element

Filter designed for handling fuming nitric acid in tank trucks also serves as a portable or stationary unit for highly corrosive liquids and many other applications.

Filter has a woven Teflon cloth filter element, supplied ready for service in stainless steel pressure housings. This cloth has slot-like



Filters highly corrosive liquids

pores 300 microns long and 150 microns wide which provide rapid and efficient filtration. Other grades with 40 and 25 micron pores are also available.

(Fuming nitric acid filter is product of Porous Plastic Filter Co., Inc., Dept. CP, 30 Sea Cliff Ave., Glen Cove, N. Y. . . or for more information check CP 3609 on form opposite last page.)

Condensed catalog of plastics

Variety of products made from polyethylene and polyvinyl chloride are described in condensed catalog.

Condensed catalog on plastics is issued by American Agile Corp., Dept. CP, PO Box 168, Bedford, Ohio. When inquiring check CP 3610 on form opposite last page.

WHERE CORROSION IS A FACTOR . . .



...CUTS
MAINTENANCE
PAINTING
COSTS
UP TO 25%

Acids and alkalis create corrosion problems, but Tygon "ATD" Hot Spray Paint solves those problems with superior protection provided by a dense vinyl film . . . smooth, run-free and attractive. And at a total savings on job costs of up to 25%!

Tygon "ATD" Paint is specially formulated for hot spray application. Heat does the thinning, hence no thinners are needed—and there is less overspray. The result is a savings on materials of up to 20% and, since two coats do the work of five, labor costs are cut up to 30%.

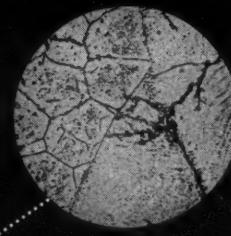
PLASTICS AND SYNTHETICS DIVISION

U. S. STONEWARE
AKRON 9, OHIO

207-E
Write today for
your copy
of Bulletin
ATD-9.

When inquiring check CP 3611 opposite last page

BETTER SOLUTION TO TOUGH Corrosion Problem



Carpenter 7Mo Stainless Tubing & Pipe

This photomicrograph may help you solve stress corrosion cracking problems. It shows Carpenter 7Mo Stainless Pipe (left) welded to a Type 316 fitting. Note how corrosion-inviting cracks in fitting (right) stop at interface of pipe. The 7Mo pipe had outlasted three such fittings before the picture was made because of its stout resistance to stress corrosion cracking, even in the presence of chlorides or other

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, New Jersey

When inquiring check CP 3612 opposite last page

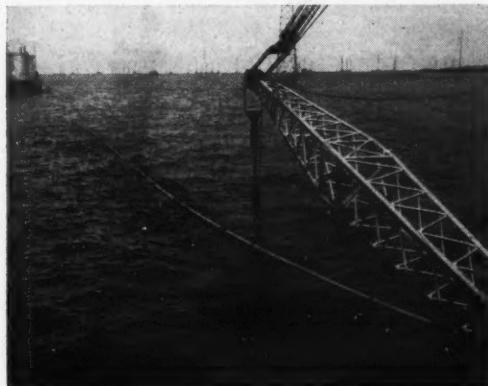
CHEMICAL PROCESSING

CORROSION CONTROL

Underwater pipeline of aluminum carries oil from well to flow station . . .

Creole Petroleum Corporation uses 1000' line in Venezuela

World's first permanent underwater oil pipeline of aluminum was recently welded and submerged in Lake Maracaibo, Venezuela. The 1000' line will be used by Creole Petroleum Corporation to carry crude oil from an underwater well to a flow station on the lake shore. A pilot installation of aluminum pipe



First aluminum underwater oil pipeline being lowered into lake from a barge

for test purposes came after a protective coating applied to a steel pipe installation was attacked by the barnacle-like Teredo, a small aquatic animal.

Aluminum, highly resistant to salt water corrosion, was selected to combat the Teredo. The schedule 40 pipe is submerged at a depth of 15 to 20 feet below the lake surface.

(Pipeline is product of Aluminum Co. of America, Dept. CP, 1501 Alcoa Bldg., Pittsburgh 19, Pa. . . . or for more information check CP 3613 on form opposite last page.)

Large-size sheets of PVC in custom sizes . . .

available in sheets 44" wide to 144" long

Unplasticized structural polyvinyl chloride plastic now comes in sheets 44" wide by any length up to 144" for use by fabricators serving the chemical processing and food processing industries. Thicknesses range from 1/16" to 3/8".

(Vyflex F-92 structural PVC is a product of Kaykor Industries, Inc., Dept. CP, Yardville, N.J. . . . or for more information check CP 3614 on form opposite last page.)

PERFORMANCE VERIFIED / by acid test

Even before a Powell Corrosion Resistant Valve is made, it must pass the acid test. For quality control begins with the very materials which go into Powell Valves.

Constant laboratory control is one of the many ways we make certain that Powell Corrosion Resistant Valves will give dependable flow control. Another is the final step of manufacture: *every Powell Valve is subjected to an actual line test.*

To keep pace with the rapidly expanding

chemical and process industries, Powell has designed many new types of Corrosion Resistant Valves. The variety of pure metals and special alloys in which they are available has grown to such an extent that today there is a Powell Corrosion Resistant Valve to control the flow of almost every known, corrosive fluid.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our COMPLETE quality line which has

PERFORMANCE VERIFIED.

The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR



FIG. 1503 SS (Sectional)—
150-Pound Alloy Steel Gate Valve.

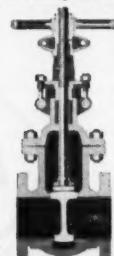


FIG. 3065 SS (Sectional)—
300-Pound Bolted Cap
Alloy Steel Horizontal
Lift Check Valve.

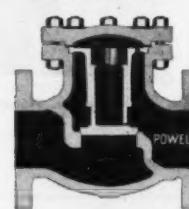


FIG. 1333 A (Sectional)—Integral
Bonnet Angle Valve For Pressures
of 1500 and 2500 W.S.P.

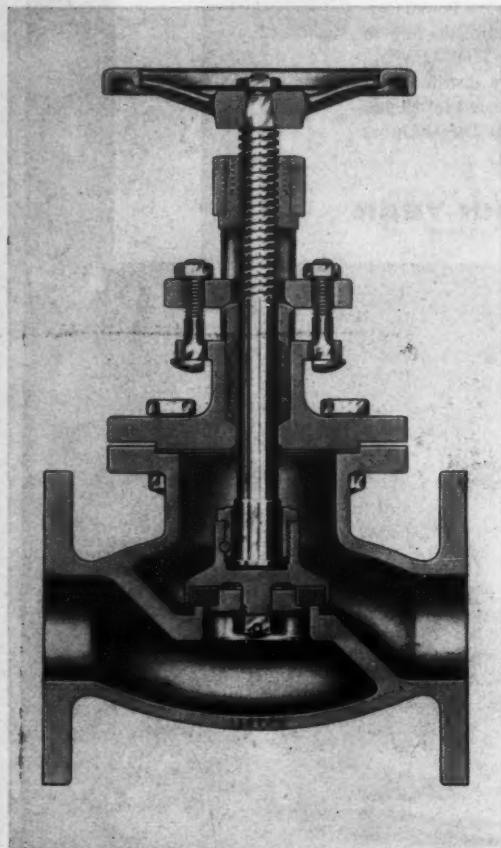


POWELL VALVES

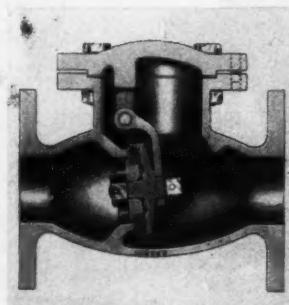
BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

When inquiring check CP 3615 opposite last page

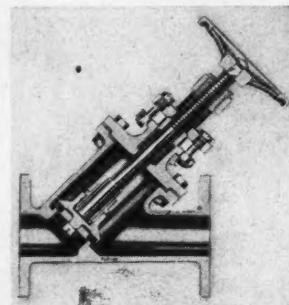
Aloyco valves with renewable Teflon discs out-last metal-to-metal seated valves



ALOYCO GLOBE VALVE features special holder for renewable Teflon disc to prevent force-out even under heavy overloads.



ALOYCO SWING CHECK VALVE offers greater seat tightness for tighter closing and longer life with renewable Teflon disc.



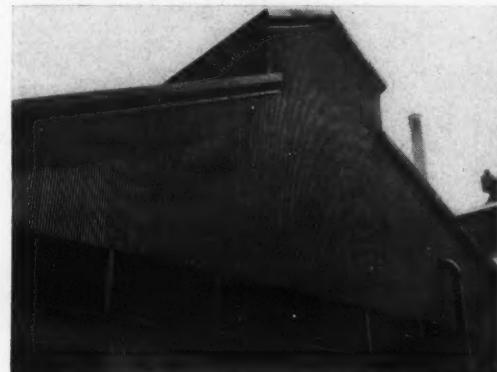
ALOYCO Y VALVE is easier to maintain and repair, thanks to Teflon disc. Also readies this valve for vacuum service.

CORROSION CONTROL

Paint system on galvanized steel withstands corrosive atmosphere for three years . . .

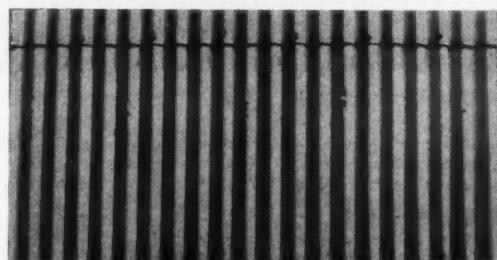
consists of primer followed by two coats of vinyl formulation

Coating system employed by the Homestead Works of U.S. Steel Corporation on corrugated galvanized steel sheets on buildings shows remarkable freedom from corrosion after more than three years in corrosive atmosphere encountered around steel plant. Paint system comprises a primer coat of Vinsynite AU-1, followed by a double coat of vinyl paint.



Building at Homestead Works, U.S. Steel Corporation, covered with galvanized corrugated steel sheets which have been painted with vinyl system before erection

Vinsynite is an improved wash-primer type of pre-coating which deposits a phosphate coating and a thin organic film in one application, thus forestalling corrosion and providing excellent adhesion for top-coats of paint on freshly galvanized surfaces. Double vinyl topcoat increases durability and is non-flammable. It is available in a variety of colors.



Closeup of section of same building, showing freedom from corrosion after more than three years in corrosive atmosphere of steel plant

Spray application is accomplished before erection by means of a conveyorized production line. In addition to speeding up painting, this method permits coating all parts of each sheet, including laps and edges. Use of pre-erection painting and present coating system have been a standard part of the U.S. Steel



When inquiring check CP 3616 opposite last page

CORROSION CONTROL

maintenance program in most plants in the Central Division for the past four years.

(For more information on Vinsynite-vinyl paint system contact Specialty Coatings Inc., Div of Thompson & Co., Dept. CP, 1085 Edwards St., Oakmont, Pa. . . . check CP 3617 on form opp. last page.)

Filters handle corrosive liquids at temperatures of 1200°F and pressures of 2000 psi

Line of porous stainless steel filters is designed for use at temperatures up to 1200°F and pressures of 2000 psi. Corrosives liquids or gases can be handled.

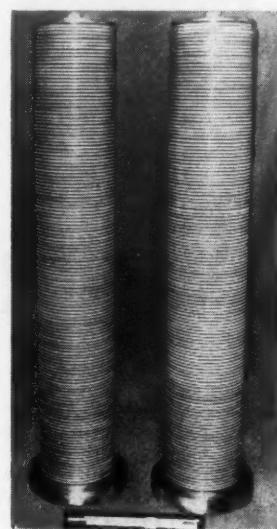


Fig. 1—Filter elements used on highly viscous polymer

Poro-Klean filter elements are produced from spherical powdered stainless steel alloys. Manufacturing techniques permit production of a variety of porous metals with a wide range of properties for various applications. For unusual conditions, custom engineered filters can be made.

One example of a custom-engineered filter is shown in figure one. These two filter elements are used on a highly viscous (3,000,000 cps) polymer above 500°F and under a pressure exceeding 2000 psi. This single unit measures 54" high and 9" in diameter.

Figure two shows housings designed for filter handling 180 gpm of naphtha at 400°F and 700 psi operating pressure. This unit is cleaned with nitrogen gas by reverse flush.

(Poro-Klean filter is product of Cuno En-

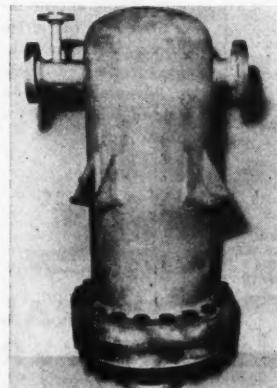
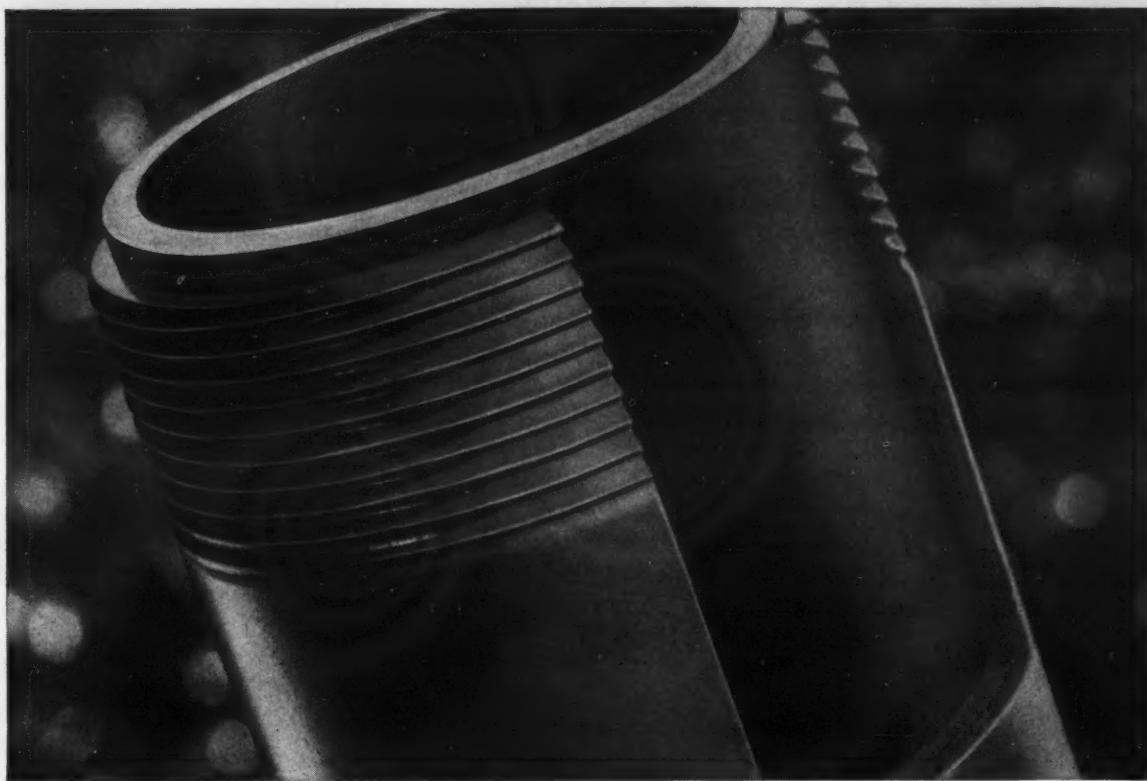


Fig. 2—Housing designed for filtering naphtha

gineering Corporation, Dept. CP, Meriden, Connecticut . . . check CP 3618 opposite last page.)



You can see why Saran Lined Pipe cuts corrosion costs

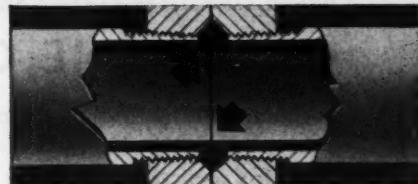
It's made of corrosion-resistant saran swaged into rigid non-bursting steel . . . liquid never touches metal in these installations

Here's your best way to convey acids, alkalies and other corrosive liquids—saran lined pipe, fittings and valves. This modern piping is corrosion resistant . . . forms snug, leakproof joints . . . is available for working pressures up to 150 psi. Fittings and valves are also available in steel for working pressures to 300 psi.

Installation costs are low with saran lined pipe, fittings and valves. Saran lined pipe can be cut and threaded in

the field with available pipe-fitters' tools. Its rigidity means few supporting structures are needed.

Saran lined pipe has an outstanding record of trouble-free performance in the chemical, petroleum, waste, pulp and paper, metal finishing, and food processing industries. For further information send in the coupon at the right. THE DOW CHEMICAL COMPANY, Midland, Michigan.



Liquid never touches metal in saran lined pipe even at a flanged connection like this.

Saran Lined Pipe Company
2415 Burdette Avenue
Ferndale 20, Michigan
Dept. SP6258

Please send me information on saran lined pipe, valves and fittings.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

you can depend on DOW PLASTICS

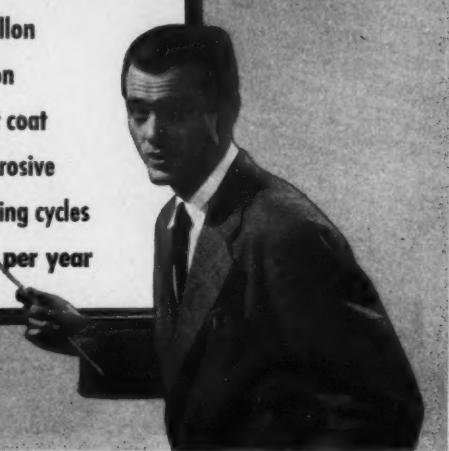


When inquiring check CP 3619 opposite last page

**before you buy or specify
protective coatings
STUDY THIS ENGINEERING APPROACH**

COMPARE...

- Solids contents
- Coverage per gallon
- Mil feet per gallon
- Mil thickness per coat
- Resistance to corrosive
- Estimated recoating cycles
- Cost per sq. ft. per year of service



AFTER YOU HAVE COMPARED, YOU WILL CHOOSE CARBOLINE COATINGS

because Carboline Coatings score high on all these basic points. Use this sound engineering approach to compare protective coatings . . . don't buy blindly. You will convince yourself that quality protection is far more important and economical than low initial cost paint.

FREE . . . new 12" x 18" comparative guide form blanks for your use in comparing coating systems. Shows method to arrive at cost per sq. ft. per year of service for each system considered. Write for your free copy today.

Sales Offices in New York, Philadelphia, Detroit, Chicago, Houston, San Francisco and other leading cities.

carboline
COMPANY

A Division of Mullins
Non-Ferrous Castings Corporation

Specialists
in Corrosion Resisting
Coatings and Linings

333 Thornton Ave., St. Louis 19, Mo.

When inquiring check CP 3620 opposite last page

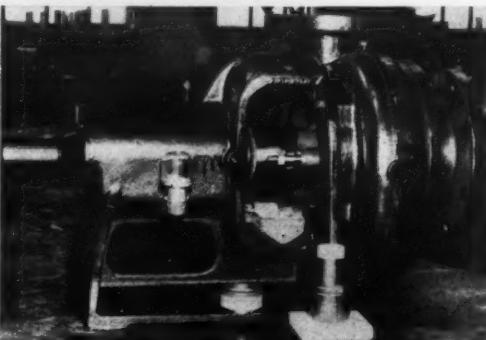
CORROSION CONTROL

**Pump handling 94% sulfuric acid
at West Coast uranium plant
uses mechanical seal . . .**

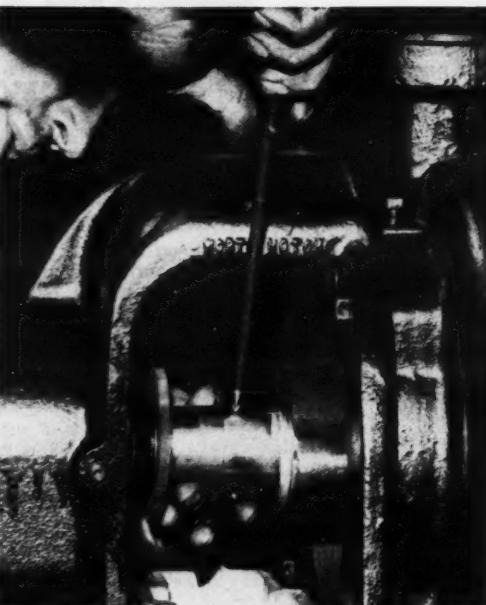
device replace packing, gives long service life

Replacement of conventional packing with a mechanical seal enables chemical pump, handling 94% sulfuric acid at a West Coast uranium plant, to give longer maintenance free service. Chempro seal is used on a Worthington 4 CNG-84 Worthite chemical pump. Seal can be installed, usually in less than 30 minutes, without any changes in pump. Operating temperature range is from -80 to +500°F at pressures from vacuum to 35 psi.

Units are fabricated from the following materials



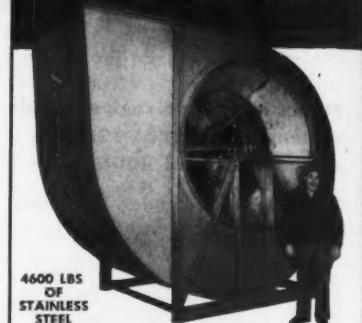
Rotary unit (on wooden pedestal, right) and stator (on pump base, left) of mechanical seal before installation in chemical pump



After assembly, gap is set to insure self alignment of seal

General Engineered

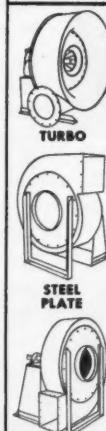
FOR AIR HANDLING IN
CHEMICAL PROCESSING



4600 LBS
OF
STAINLESS
STEEL
The huge blower shown here is a backward blade unit. General builds this type in capacities from 700 CFM to 240,000 CFM wheel diameters from 12" to 73".



This blower has a forward curve wheel. Capacities range from 180 CFM to 240,000 CFM—wheel diameter from 4" to 73".



General has years of experience in building blowers which handle corrosive agents. Pressure fans range in capacity from 4 oz. to 48 oz. pressures—400 CFM to 10,000 CFM and from 1800 RPM to 3600 RPM. Backward blade and forward curve wheel designs are available in both direct drive and belt drive—in alloy steels and neoprene or chemical coatings. Pressure fans can be provided with seals for handling gases.



**GENERAL
BLOWER
COMPANY**

8605 FERRIS AVE.
MORTON GROVE, ILL.

When inquiring check CP 3621
opposite last page

CHEMICAL PROCESSING

used in selected combinations to meet particular operating conditions involved: Type 20 stainless steel, or other stainless alloys, Monel, bronze, Hastelloy, and carbon, glass, or zirconium-filled Teflon. Seals are available in a variety of styles, made in standard shaft sizes for economical interchangeability of parts. (Chempro mechanical seals are a product of Chemical and Power Products, Inc., Dept. CP, 11 Broadway, New York 4, N. Y. . . . or for more information check CP 3622 on form opposite last page.)

Mineral and organic scale removed through use of chelating agents . . .

keeps equipment clean without shutdown

Uses: For removal of scale from heat exchange and evaporator equipment.

Features: Regular use of method will prevent further buildup of scale and keep equipment clean without necessity of shutdown.

Description: Improved method for removal of mineral and organic scale consists of using the chelating agents known as the Tetrines, with caustic. Based on amount of mineral scale present, the stoichiometrically calculated amount of chelating agents is added to a 3-5% caustic soda or soda ash solution. This solution is circulated through system at about 200-210°F for two to eight hours, depending on amount of scale present. If this scale is quite heavy, a second application may be necessary.

(Tetrines, chelating agents, are manufactured by Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. . . . or for more information check CP 3623 on form opposite last page.)

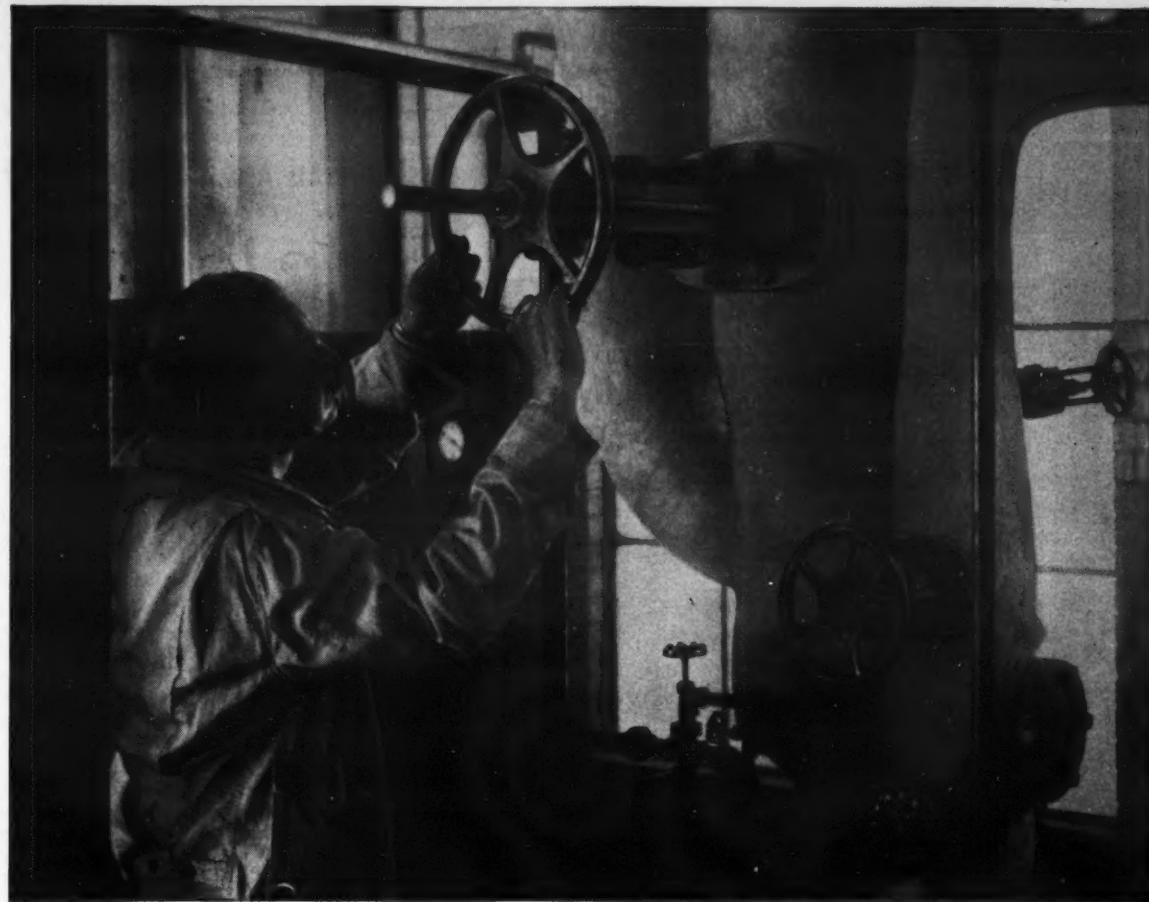
Delicate instruments protected by film four thousandths of an inch thick . . .

has tensile strength of about 25,000 psi

Translucent barrier of film four thousandths of an inch thick protects delicate instruments from corrosive atmospheric conditions. Film, made of Bakelite fluorothene resins, has tensile strength of about 25,000 psi.

As a test, a pocket watch sealed in a package of the film was immersed in fuming nitric acid at 230°F for five minutes. Watch was unaffected and continued to run.

(Fluorothene film is produced by W. S. Shamban & Co., Dept. CP, Culver City, Calif. . . . or check CP 3624 on form opposite last page.)



**Phenol at 350° F.
no problem for these Crane Valves**

THE CASE HISTORY—Refinery men know that handling hot phenol can be rough on valves and cause a lot of headaches. Or it can be a smooth, efficient valve operation—year in and out—as experienced here at the Continental Oil plant at Ponca City.

These Crane No. 47X 150-pound cast steel gate valves are on phenol service at 60 psi., 350° F. They're on the exhaust line from extraction tower bottoms pump in the aromatic extraction unit.

Installed in 1944, these Crane

valves have required only routine maintenance. Operated about twice a month—they continue to make tight closure with ease—with no leakage or sticking.

Outwardly Crane valves may look like many others. But it's a mistake to assume all steel gate valves are alike.

The difference that's most important to you is inside—for instance, in the extra skill and care that goes into Crane seating design and materials. That's what makes Crane valves such outstanding

performers on refinery services. You can get Crane quality steel valves for every refinery need—gates, globes, angles and checks—with screwed, flanged or welding ends—in sizes up to 24 in.—in pressure classes up to 2500 psi.

Your local Crane Representative can give you valuable help in specifying and ordering.

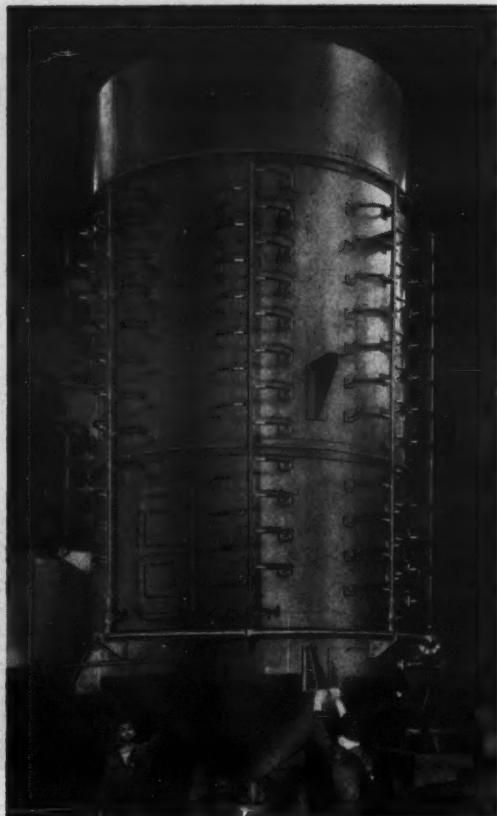


CRANE VALVES & FITTINGS
PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

When inquiring check CP 3625 opposite last page

AIR CLEANING IN METALLURGICAL PROCESSES



HARMFUL OXIDES OF LEAD AND ACIDS REMOVED

BY

"Buffalo"

PROBLEM: The burning of old lead and melting of lead ingots in a reverberatory furnace resulted in a hot effluent gas containing harmful oxides and acid contaminants. The corrosive nature of the effluent prevented solution of this nuisance and health hazard by ordinary air cleaning equipment.

SOLUTION: A "Buffalo" Hydraulic Scrubbing Tower was selected. This unit utilizes pre-cooling sprays at low pressure (waste water) and high pressure fog sprays (400 psi at nozzles). This Tower is of corrosion resistant materials, lead-lined inside, with phenolic coated nozzles. It cleans by spray scrubbing action and gravity travel of materials trapped in fog layers.

RESULT: The effluent gases were rendered nuisance-free from the start, and operation has been trouble-free. Even after more than 3 years, no replacements of linings or nozzles have been made or required. Other advantages have been very low resistance to gas flow, small floor space requirements, stable performance and easy access to all operating parts for maintenance without interruption to production.

PUT "BUFFALO" EXPERIENCE AND FACILITIES TO WORK ON YOUR AIR CLEANING PROBLEM

This is one of hundreds of records in our files on the successful solution of air cleaning problems in every industry. This experience, plus "Buffalo" air cleaning units and factory facilities, are ready to help you. Just call on the "Buffalo" engineer in your nearest principal city.



VENTILATING • HEATING • AIR CLEANING
AIR TEMPERING • INDUCED DRAFT • EXHAUSTING
COOLING • FORCED DRAFT • PRESSURE BLOWING



When inquiring check CP 3626 opposite last page

CORROSION CONTROL

Sulfuric acid economically heated with shell and tube glass exchanger . . .

heater can also be used for wide variety of other corrosives

Uses: To heat corrosive liquids in glass tubing by introduction of steam into an enclosing steel jacket.

Features: Shell and tube steam heater, which has been field-tested for 18 months, has proved economical to operate and maintain, particularly in the rayon industry, where it is being used to reheat sulfuric acid spinning baths. Unit can also satisfactorily handle a variety of other corrosives.



For heating corrosives with steam

Description: Twenty-six $\frac{3}{4}$ " thin-wall Pyrex brand glass tubes are mounted inside an 8" diameter steel jacket. Live steam, introduced through an inlet in middle of unit, flows to both ends of 12' tube, condenses on glass tubing, and condensate flows to drain. Header or tube sheet assembly is held in place by a Monel retainer ring and steel flanges.

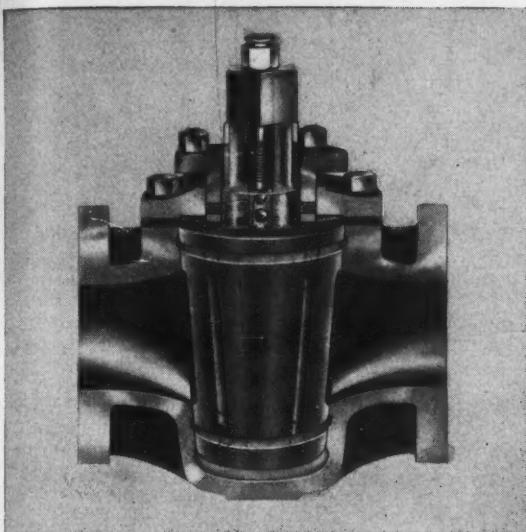
Steam heater has carried heat loads of 975,000 Btu/hr. Overall coefficients have been measured up to 175 Btu/hr/ft²/°F in water-to-water tests. Maximum operating temperatures are 450°F at steam inlet and 200°F in glass tubes. Heater has a flow capacity of about 270 gpm.

(Shell and tube heater is product of Corning Glass Works, Dept. CP, Corning, N.Y. . . or for more information check CP 3627 on form which is located opposite last page.)

Plastisol coatings described on data sheet

Two-page data sheet covers corrosion-resistant plastisol coatings. Products are manufactured from fine particle size polyvinyl chloride resins to which are added specific plasticizers. Finish is heat-fused onto metal base and finally cured to a smooth, tough resilient surface. Coatings described are inert to virtually all inorganic reagents as well as to many organic compounds.

Data sheet 75 is issued by Quelcor, Inc., Dept. CP, Front and Broomall Sts., Chester, Pa. When inquiring reader may simply check CP 3628 on Reader Service slip which is located opposite last page.)



ROCKWELL- Nordstrom **VALVES** **CUT COSTS** on any corrosive service

Corrosion resisting metals *plus* lubricant protection make Rockwell-Nordstrom lubricated plug valves a better investment than any other valve you've ever used on processing lines or equipment. Available in semi-steel, steel, stainless steel, Ni-Resist, bronze and Monel, Rockwell-Nordstrom valves assure trouble-free dependability on even the most corrosive service. They cost no more to buy, often less, than ordinary valves—and they continue to save money year after year because:

PRESSURIZED LUBRICANT SEALING eliminates the uncertainties of metal-to-metal seating. Thin, tough film of pressurized lubricant holds lightest gases or heavy slurries.

SEAT IS NEVER EXPOSED to corrosive-erosive line material . . . cuts reseating costs.

LESS DOWN TIME because galled or jammed valves are eliminated. Powerful cushion of pressurized lubricant seats plug for quarter-turn operation.

No matter where you use Rockwell-Nordstrom valves they will save you money. Write for more details.



ROCKWELL
MANUFACTURING COMPANY
Pittsburgh 8, Pa.
40th YEAR of lubricated plug valve leadership

When inquiring check CP 3629 opposite last page

FEBRUARY, 1956

CORROSION

**Compatibility with variety
of top coats provided
by vinyl primer . . .**

has drying time of 15 min
at temp of 70°F

Uses: As a primer for chemical coatings.

Features: Primer is compatible with vinyls, phenolics, furans, chlorinated rubbers, one-package neoprene, oil base and alkyd-type finishes. This permits one primer to be used for all these finishes, reducing inventory.

Primer has a drying time of 15 minutes at 70°F. Topcoats can be placed over the primer after about 30 minutes.

Description: Modified vinyl primer has good chemical resistance in itself and will prevent undercutting when a coating is damaged. It can be applied by brush or spray and gives a coating two mils thick. It has a solids content of 48%. Adhesion is good to sandblasted steel, bright steel, wirebrushed steel, cast iron, concrete, or Transite.

(Rustbond Primer #6 is a product of Carboline Co., Div. of Mullins Non-Ferrous Castings Corp., Dept. CP, 331 Thornton Ave., St., Louis 19, Mo. . . . or for more information check CP 3630 opposite last page.)

Stainless fastener data book

Two-color, 52-page data book gives complete information and photographs on a variety of stainless steel fasteners. First section of book includes specifications and other data while second part gives information on types of stainless steels available for products.

Stock List and Data Book on stainless fasteners is issued by Allmetal Screw Products Co., Inc., Dept. CP, 821 Stewart Ave., Garden City, Long Island, N.Y. When inquiring specify CP 3631 on form opposite last page.



Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

If you have a wire cloth problem involving corrosion, please tell us about it . . . we may have the answer.

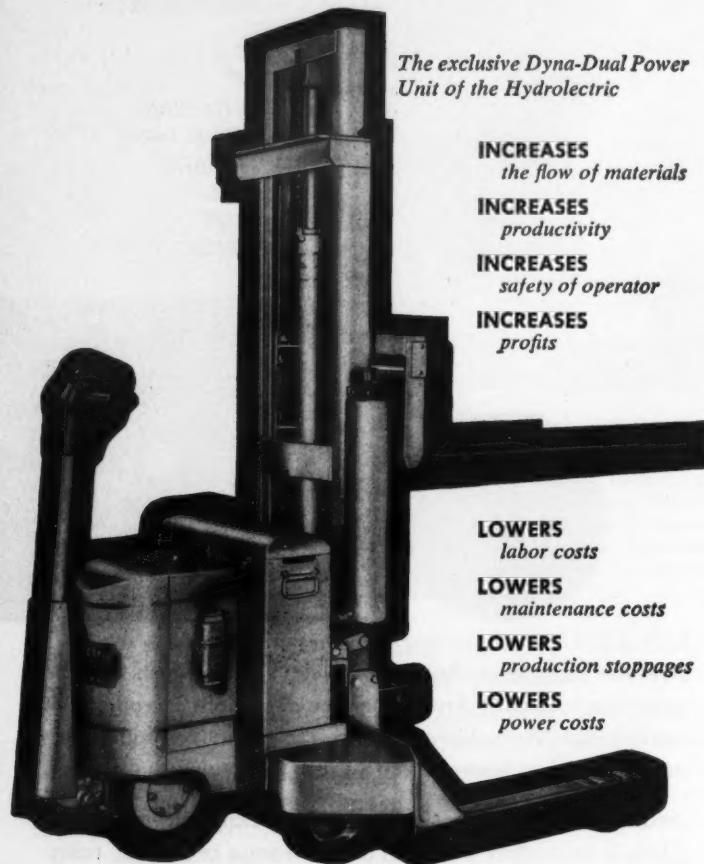


When inquiring check CP 3632 opposite last page

115

MODERNIZE WITH America's most Modern Truck **HydroElectric**

A GREAT NAME IN LIFT TRUCKS



The exclusive Dyna-Dual Power Unit of the Hydroelectric

INCREASES
the flow of materials
INCREASES
productivity
INCREASES
safety of operator
INCREASES
profits

LOWERS
labor costs
LOWERS
maintenance costs
LOWERS
production stoppages
LOWERS
power costs

The only truck with 2 driving wheels and 2 braking systems. In fact Hydroelectric does everything a good lift truck should do.

STUEBING Designed • Engineered • Built



LIFT TRUCKS, INC., / CINCINNATI 14, OHIO



THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

material handling

Plant waste on the acid side emerges from processes of Toms River-Cincinnati Chemical Corporation's dyestuffs operation. In order to meet local ordinances, plant . . .



handles liquid, sediment, sludge, and filter cake in integrated waste-treatment system

Pretreating system removes 32,500 pounds of solids daily and can treat up to 1,000,000 gallons per day

Problem: Cincinnati, like many other communities along the Ohio River Valley, regulates the type of industrial waste that can be put into the city sewage system. A surcharge is levied on all sewage above "normal strength." This, of course, is a great stimulus for industry to consider pretreatment of its industrial waste.

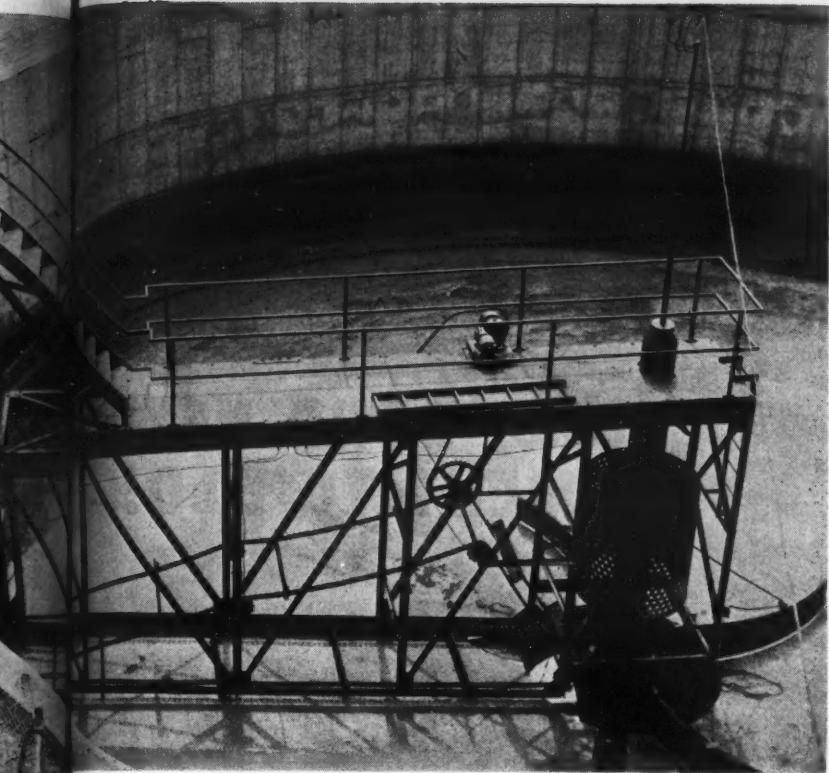
Cincinnati Division of Toms River-Cincinnati Chemical Corporation, makers of a line of dyestuffs for the textile industry, was particularly concerned. Because of the nature of reactions involved, large quantities of spent sulfuric acid are discharged from this process. Waste is very

potent and large quantities of lime are needed to neutralize it before discharge into city sewers.

Result is a sludge that has a high content of suspended solids. In the past this neutralized waste was fed directly into the sewage system, but under the new ordinance this waste was considered to have too high a solids content. Unless solids could be reduced, Cincinnati Division would have had to pay the surcharge.

Solution: Company decided to install its own pretreatment plant to remove most of the solids so that waste would

When inquiring check CP 3633 opposite last page

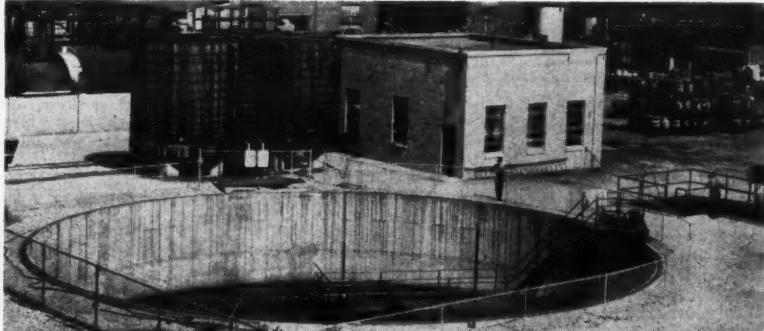


Sludge collector in use at the Cincinnati operation. Material is drawn toward sump by plow and chain-drag conveyor arrangement at bottom of tank

adhere more closely to new standards. R. L. Woolpert Company, consulting engineers from Dayton, Ohio, were called in, and after their study it was decided to build the following facilities:

- a combined inlet-outlet chamber which would receive all waste from plant
- a 200,000-gallon primary settling tank, equipped with sludge-removal facilities. This tank provides a four-hour detention for a

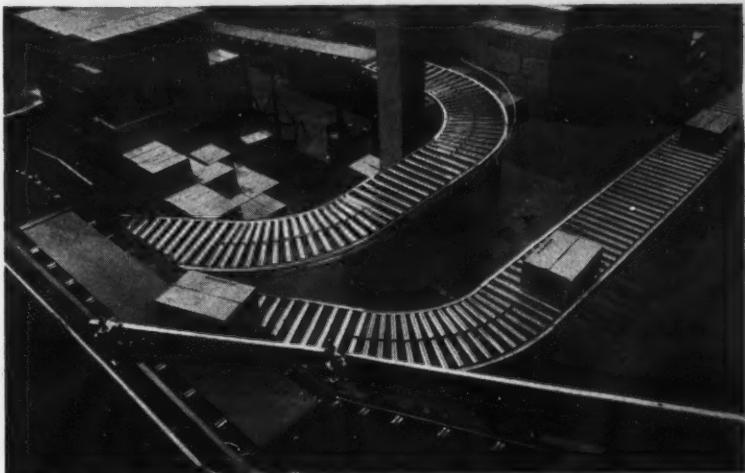
(Please turn to page 120)



Complete filter plant occupies relatively small area. Concrete block building at center contains rotary filter for final processing of the waste

Ask Standard

how to cut costs with conveyors



Order picking is expedited and simplified by this Standard system of roller and belt conveyors in large warehouse.

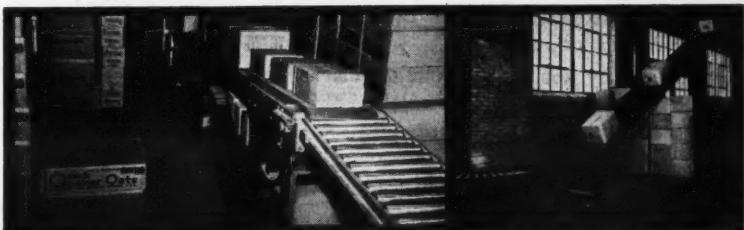
Roller and belt conveyors ease warehouse traffic jams

FAST flow of goods and simplified labor add up to more profitable warehouse operations.

Standard offers a wide variety of gravity and powered, permanent and portable conveyors — that can help you establish smooth, more profitable warehousing.

Spend a few moments with a Standard engineer. He'll show you how in-

expensive Standard conveyors give you maximum flexibility at minimum cost. He'll show you, too, how Standard conveyors provide the many advantages of a custom-designed system at low cost. For the name of your nearby Standard engineer write STANDARD CONVEYOR COMPANY, General Offices: North St. Paul 9, Minn. Sales and Service in Principal Cities.

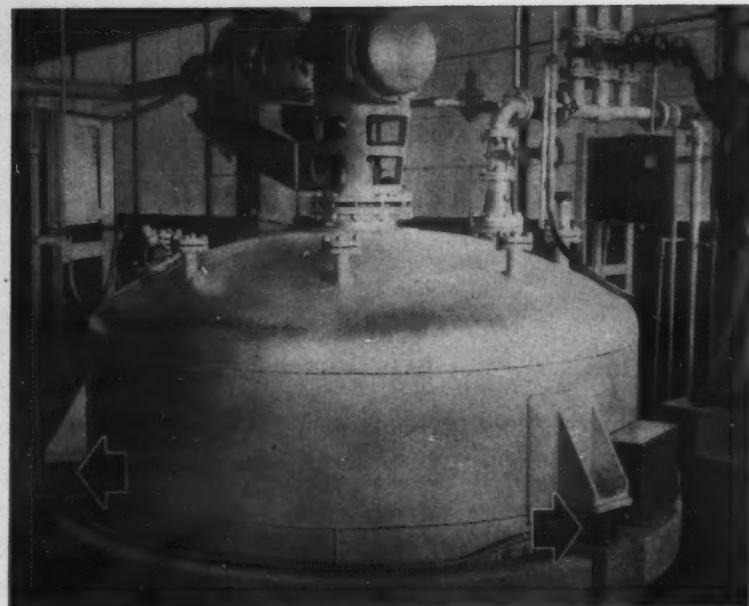


(LEFT) Belt-booster in a gravity roller conveyor "order picking" line. (RIGHT) Lift or lower floor-to-floor with an INCLINEBELT. Available in a wide range of heights and belt widths.

Write Dept. P-2. Before you call, contact the Standard engineer listed in your classified phone book.



When inquiring check CP 3634 opposite last page



how Baldwin electronic weighing increases process accuracy

Whether your process is batch or continuous, utilizing solids or liquids, Baldwin can build an electronic weighing system for you with accuracy as high as 1/10%.

Weight-sensing elements are fist-sized SR-4® transducers which install conveniently below tanks or bins. These load cells send out electrical signals which can be utilized in a variety of ways. In the relatively simple system pictured above, signals are transmitted to a Baldwin indicator calibrated in pounds; an operator reads the indicator and adjusts flow of materials manually. More elaborate Baldwin electronic weighing systems can provide for any desired degree of automatic process control, up to and including closed-loop feedback.

Why not see how our engineered systems can solve your problems? For bulletins 4302 and 4309, write to Electronics & Instrumentation Division, Baldwin-Lima-Hamilton Corporation, 806 Massachusetts Avenue, Cambridge, Mass.

BLH → **BALDWIN-LIMA-HAMILTON**
Divisions: Austin-Western • Eddystone •
Electronics & Instrumentation • Hamilton
• Lima • Loewy-Hydropress • Madsen •
Pelton • Standard Steel Works

When inquiring check CP 3635 opposite last page

MATERIAL HANDLING

**Load-rated at 5000 lb,
truck offers three
power choices . . .**

useful where floor loading or aisle width is problem

Uses: For in-plant handling of palletized material, particularly where floor loading or aisle width is consideration.

Features: Truck's low outside turning radius — 79 inches — aids operation in confined areas.



Unit is powered by gasoline, diesel or LP gas engine

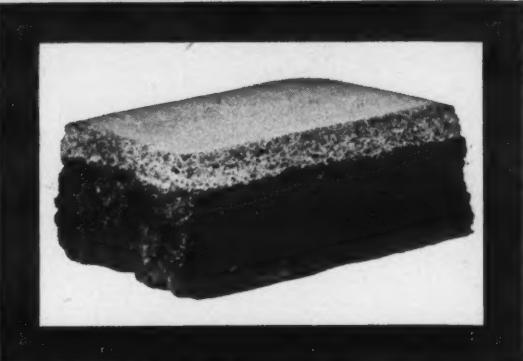
Description: Unit, rated at 5000 lb capacity, weighs 7110 lb. Standard model is powered by Waukesha gasoline engine. Diesel engine, LP gas conversion kit, Hystamatic drive are optional.

(Model HC-50 truck is product of Hyster Co., Dept. CP, 2902 NE Clackamas St., Portland 8, Ore. . . or for more information check CP 3636 on convenient Reader Service slip which is located opposite last page.)

Covers hydraulic loading arm

Photographs and information on how hydraulically-controlled marine loading arm can be used to advantage are given in 16-page bulletin. Marine and barge hose for this type of service is also described.

Bul on Marine Loading Arm is issued by Chiksan Co., Subsidiary of Food Machinery and Chemical Corp., Dept. CP, Brea, Calif. When inquiring specify CP 3637 on form which is located opposite last page.



Now! BOND NEW CEMENT TO OLD!

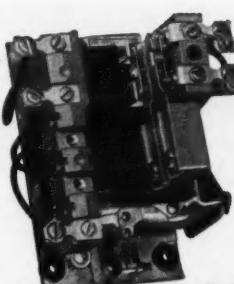
Use new Tropical Cement Bond to successfully patch or re-surface broken concrete floors, steps, driveways, shipping docks. Repairs won't crumble, break or flake. Fracture tests show old-new bond undisturbed. Clean, brush on Cement Bond, lay new mix. Save high cost of breaking up old concrete! Withstands heavy traffic. **FREE**. Your letterhead request brings complete information—write today!

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1128-1294 W. 70th, Cleveland 2, O.
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1913
SUBSIDIARY OF PARKER RUST PROOF COMPANY

When inquiring check CP 3638 opposite last page



LIQUID LEVEL CONTROLS



Control variations in levels from $\frac{1}{4}$ " upward. Remote control if desired — any distance. Controls unaffected by acids, caustics, pressures or temperatures.

Since 1933 B/W Controls have provided positive, dependable, economical liquid level control. No floats! No moving parts in liquid.

WRITE FOR CATALOG

**B/W CONTROLLER
CORPORATION**

2204 E. Maple Road
Birmingham, Mich.

When inquiring check CP 3639 opposite last page

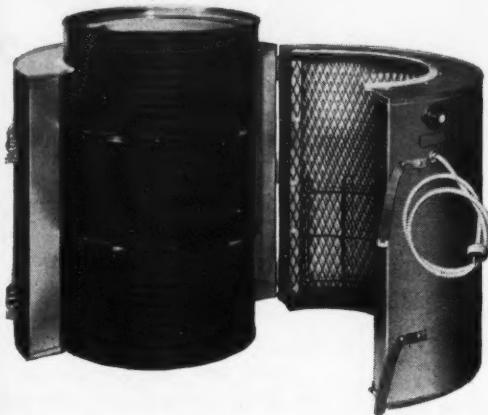
MATERIAL HANDLING

Warms viscous materials in drums for removal by dipping, pouring, or pumping . . .

heating time, depending on material, averages 25 to 30°F per hour

Uses: For drum-heating of viscous materials that handle easier when warmed. Useful for maintaining required temperature of contents over a period of time or for heating drums overnight for morning use.

Features: Average heating time for most materials is 25 to 30°F per hour. This can be varied over wide range depending on need. Two temp ranges are available: 100-450°F or 60-250°F.



Heating elements are protected by 16-gage expanded metal screen, welded to top and bottom angle

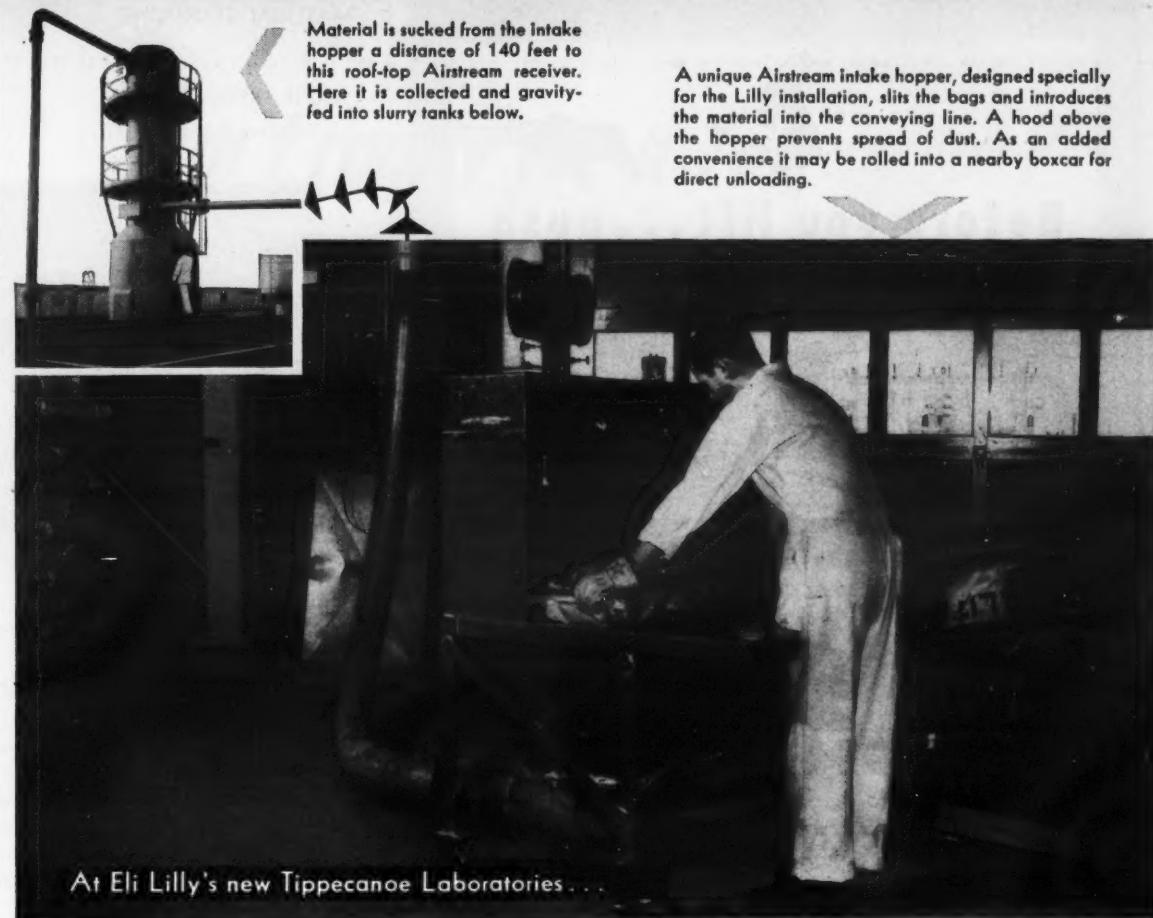
Description: Outer shell is of 20-gage steel. Heating elements are protected by 16-gage expanded metal screen welded to supporting angle. Plug-in types have grounded plugs. Units operating at 460 volts have separate panel box with 460/115 controlled voltage transformer for 115 volt control.

(Drum Warmer is manufactured by Harold L. Palmer Co., Dept. CP, 2980 W. Davison, Detroit 38, Mich. Check CP 3640 opposite last page.)

On bucket elevators for chemicals

Bucket elevators originally designed for use in cement mills which are being used successfully in various chemical operations are covered in ten-page bulletin.

Bul 3304 is issued by Chain Belt Company, Dept. CP, 4701 W. Greenfield Ave., Milwaukee, Wis. Specify CP 3641 on form opposite last page.



A unique Airstream intake hopper, designed specially for the Lilly installation, slits the bags and introduces the material into the conveying line. A hood above the hopper prevents spread of dust. As an added convenience it may be rolled into a nearby boxcar for direct unloading.

At Eli Lilly's new Tippecanoe Laboratories . . .

another "problem" material conveyed economically by Airstream

Dry materials become "problem" materials when they require special handling precautions. For example, some chemicals must be kept contamination-free; all foods must remain pure; fragile materials must not be powdered or crushed. Hundreds of these "problems" have been solved by Dracco—with the materials handled swiftly and economically by Dracco Airstream Conveyors.

An example of a Dracco-engineered solution for handling such materials is the Airstream system used by Eli Lilly &

Company at the ultra-modern Tippecanoe Laboratories in Lafayette, Indiana. Here, a friable filter aid, purchased in bags, is delivered directly to process at 7½ tons per hour from the warehouse.

A special Airstream technique protects the material against breakage which would destroy its effectiveness. The self-cleaning action of the system eliminates maintenance problems and permits instant change-over to other materials without intermixing. Fast, one-man

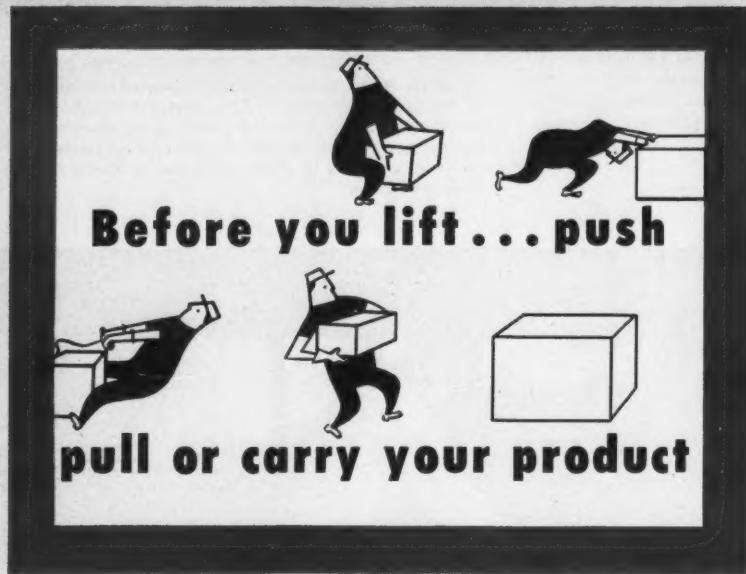
operation cuts costs, absence of dust avoids housekeeping and contamination problems.

If you have a problem in handling dry materials, investigate the advantages of Airstream conveying with its many cost-saving features. Explain your situation to Dracco—we'll do the rest. Write or call today.

DRACCO CORPORATION
4070 East 116th Street • Cleveland 5, Ohio

DRACCO
Airstream CONVEYORS • DUST CONTROL EQUIPMENT

When inquiring check CP 3642 opposite last page



call **ALVEY** first for **CONVEYORS**

You may be amazed at how many new things a modern ALVEY conveyor system can do to save manpower and speed production in your plant. You'll benefit by ALVEY's experience in the newest, biggest jobs... in almost every industry.

You and your staff will enjoy talking to an ALVEY conveyor engineer... and you'll profit by his recommendations. To have an experienced ALVEY conveyor engineer visit your plant at your convenience, simply write us.



Every time you **MAN**handle a product, you add to its cost... without increasing the value.

So, for profit's sake... **convey** your products.

ALVEY

ALVEY CONVEYOR MANUFACTURING COMPANY

9308 Olive Street Road, St. Louis 24, Missouri

Branch Offices in Principal Cities

ALV-203A

When inquiring check CP 3643 opposite last page

MATERIAL HANDLING

WASTE PRETREATMENT

(Continued from page 117)



Filter cake is plowed from rotary filter — drops to belt for conveying outside to waiting hoppers

—facilities to convey and haul dewatered material to a dump

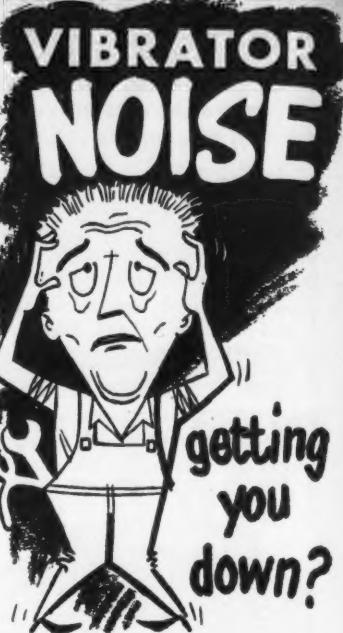
Many aspects of the installation were dictated by the corrosive and abrasive nature of waste to be handled. For example, inlet-outlet chamber is of concrete construction. Inlet section is lined with fire clay acid-resisting brick, bonded with special acid-resisting mortar. Stop gates are polyvinyl chloride-covered steel plates.

A pH recorder, automatically measuring pH of the material prior to entry into settling tank, is located in inlet section. Here, if reading is low, additional neutralizer can be added. Outlet section is also equipped with a pH recording-indicating instrument.

Settling tank, of 200,000-gallon capacity, is 68 feet in diameter. Side water depth is 6½ feet and center depth is 9½ feet. Tank's sludge collector makes one revolution every 20 minutes. As it moves, collected solids are conveyed towards sump in center of tank. At the same time, supernatant liquid overflows into Cincinnati sewage system.

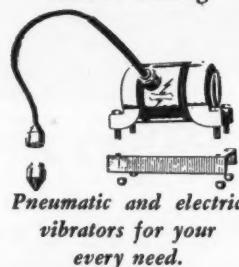


Material emerges from filter house, is collected in hoppers and carried away to dump



The racket caused by conventional electric vibrators can drive a man out of his mind. So why torture yourself and your employees... solve the problem with the new *silent* Cleveland Electric Vibrators.

These new vibrators operate on the eccentric-weight principal — they make no more noise than an electric motor. For detailed information, write for our new Electric Vibrator Catalog.



Pneumatic and electric vibrators for your every need.

Bin Stuck Lately?

THE
CLEVELAND
VIBRATOR
COMPANY

2706 Clinton Ave. • Cleveland 13, Ohio

When inquiring check CP 3644
opposite last page

CHEMICAL PROCESSING

Bridge of collector revolves on a large ball bearing at center of the tank. Outer end is carried by a rubber-wheeled truck traveling on top of tank wall. Drive is located at this point. This drive includes a $\frac{1}{2}$ -hp motor, coupled to a reduction gear unit, and the main shaft.

Sludge collector and plow are suspended from this bridge by steel supports. Collector consists of two endless strands of chain, dragging steel flights along bottom of tank toward the sump. (Although sludge is neutralized when it reaches this tank, steelwork is given a coat of bitumastic paint as added insurance against corrosion.) Collection by this method assures unagitated transportation of

Waste Treatment Figures

WASTE

	Flow gpm	Suspended Solids ppm	5-day BOD ppm
max	1500	5412	620
min	350	2500	325
avg	620	4200	460

EFFLUENT

Suspended solids ppm	5-day BOD ppm
300	240

Treatment to remove 32,500 pound solids per day, 1830 pounds BOD per day

sludge to a maximum sludge concentration.

After sludge has been collected in sump, it is pumped through two reinforced rubber hoses to two sludge concentration tanks. Each tank has a stirring mechanism and an overflow which discharges supernatent liquid back into inlet chamber at primary settling tank. Concentrated sludge goes to a coil spring filter for removal of water.

Belt conveyor, 18" wide and $19\frac{1}{2}$ ' long, carries filter cake from filter building. Conveyors discharge into hoppers which are trucked to dump.

Facilities at Cincinnati Division are designed so that a secondary primary settling tank, pumping station and filter can be installed, if necessary.

Results: Treatment of 1,000,000 gallons per day results in an effluent which complies with Cincinnati's ordinance, except for the BOD, which is slightly higher than that established for "normal sewage". However, the surcharge for the excess BOD is so small that no economy could be shown by installing equipment for its removal.

(Sludge collector and conveying equipment at Cincinnati Division, Toms River-Cincinnati Chemical Corporation plant are manufactured by Link-Belt Co., Dept. CP, 307 N. Michigan Ave., Chicago 1, Illinois. Check CP 3646 opposite last page.)

Am I ready for a Towmotor?



You are, if

your present handling operation is not fully mechanized, and requires: **1. 3 or more full-time workmen.** **2. Movement of heavy or bulky unit loads.**

In today's competitive market, you must step up your business operations with efficient handling methods. To discover how your firm can speed handling, eliminate "bottlenecks" in the flow of materials, and make maximum use of storage space, call your Towmotor representative today. He'll show you how to cut handling costs and open the door to greater profit. Write for certified Job Studies covering your industry. TOWMOTOR CORPORATION, Div. 2302, 1226 E. 152nd St., Cleveland 10, Ohio.

Read how an
Oil Company
cut Handling Costs
83%.
Ask for
Job Study #135

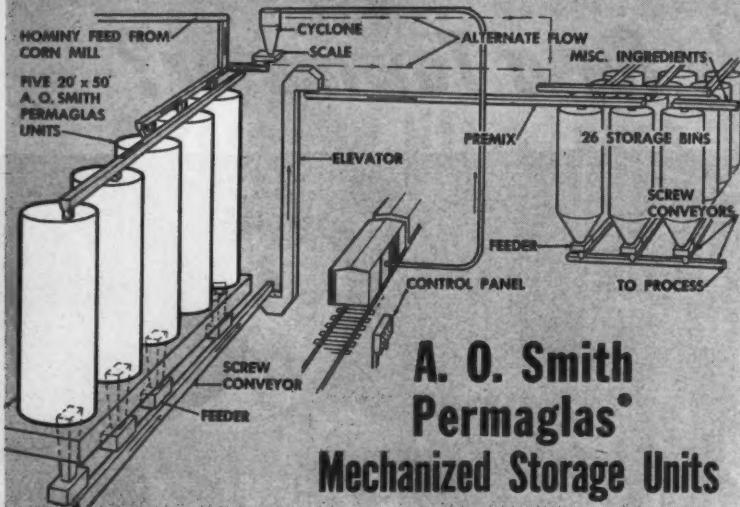
TOWMOTOR

THE ONE-MAN-GANG

THERE'S ONLY ONE FORK LIFT TRUCK CALLED TOWMOTOR

When inquiring check CP 3646 opposite last page

NEW solution to materials handling problems



A. O. Smith Permaglas® Mechanized Storage Units

Here's the most efficient way to handle free-flowing materials at lower cost.

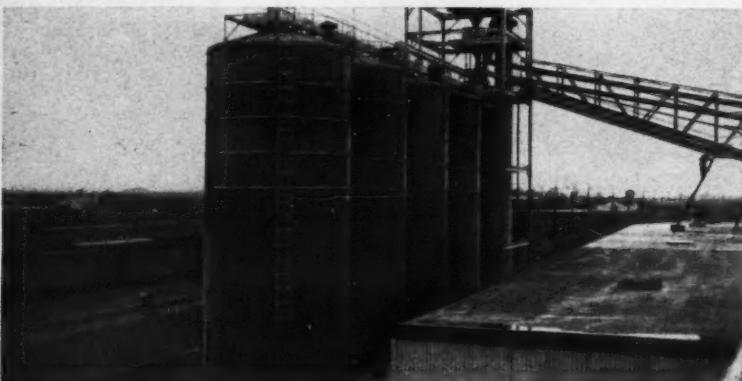
Glass-protected steel inside and out — five Permaglas Storage Units with mechanical bottom unloading are shown in the flow diagram above. They serve in a modern materials handling system used in the manufacture of Gaines Homogenized Dog Food — a product of General Foods Corp., Kankakee, Illinois.

Incoming raw materials are moved by vacuum from railroad cars to these units. Then A. O.

Smith's exclusive mechanical sweep-arm bottom unloaders take over . . . remove materials — on a first-in, first-out basis — as they are needed for mixing. Handling and storage of individual bags or containers are eliminated. Accurate proportioning of ingredients assures consistent product quality.

Mail coupon for more information about A. O. Smith's Permaglas Mechanized Storage Units for more efficient bulk materials storage and handling.

New 6-page bulletin covers complete specifications of Permaglas Storage Units with mechanized bottom unloader.



Through research  ...a better way

A.O. Smith
CORPORATION

HARVESTORE DIVISION
Kankakee, Illinois

Distributor: SPROUT-WALDRON
Muncy, Pennsylvania

A. O. SMITH CORPORATION
Harvestore Division • Kankakee, Illinois

Please send me complete facts about Permaglas Mechanized Storage Units.

Name

Address

City State

When inquiring check CP 3647 opposite last page

MATERIAL HANDLING

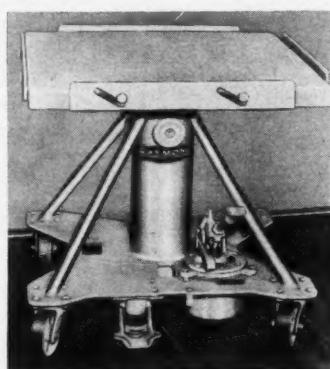
Add sidebars to table for lifting parts, machinery . . .

retractable guards prevent work from rolling off elevator; guards instantly positioned

Uses: For use where loads or equipment must be lifted accurately to height of processing equipment or maintenance machinery.

Features: Retractable sidebars on table prevent load from rolling over edge. These bars can be lowered quickly for loads which must extend over edge of table.

Description: Hook-shaped slots in retractable sidebars permit them to be instantly set in either



Load can't slip off this table while being raised or lowered

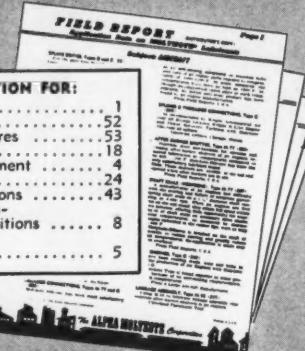
up or retracted position. When raised, these prevent load from sliding off table top. Bars form a 1-inch-high fence on four sides of table. Bars are ready for instant use — no bolts need to be tightened or loosened to change their position.

Lifting table itself is hydraulically operated by footpedal. It can be anchored in place, or it can be left free to roll to a new location when so desired.

(Elevating table with sidebars is a product of The Raymond Corp., Dept. CP, 63-136 Madison Street, Greene, N. Y. . . or for more information reader may simply check CP 3648 on form which is located opposite last page.)

SEND TODAY FOR
THESE FIELD
REPORTS ON

MOLYKOTE® LUBRICANTS



LUBRICATION FOR:	
Aircraft	1
Cutting Tools	52
Dusty Atmospheres	53
Forming	18
Hydraulic Equipment	4
Machining Tools	24
Metal Compositions	43
Plastics and Non-Metallic Compositions	8
Steel and Non-Ferrous Mills	5

Write For Them By Number

Hundreds of actual case histories from our customer files . . . a "must" in industrial lubrication . . . don't hesitate . . . write today.

The ALPHA MOLYKOTE Corporation

Main factories:
66 Harvard Avenue, Stamford, Conn.
71 Arnulfstrasse, Munich 19, Germany

When inquiring check CP 3649 opposite last page

BIN-FLO AERATING UNIT

Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.



BIN-DICATOR BIN LEVEL INDICATOR

For All Bulk Materials

signals change in level;
automatically starts
and stops filling and
emptying equipment.



THE BIN-DICATOR CO.

13946-D Kercheval • Detroit 15, Mich.

NEW
DETAIL DATA
BOOK
FREE

When inquiring check CP 3650 opposite last page

CHEMICAL PROCESSING

MATERIAL HANDLING

Electric truck operation at lower cost . . .

leasing plan permits use of electric lift trucks with lower initial cash outlay

A plan is now available enabling industrial users to operate electric fork and lift trucks with relatively low initial cash outlays. Purchasers of electric industrial trucks may lease batteries and chargers for periods up to five years by selecting one of several leasing and purchase-option agreements. Effect is to bring average initial outlay for electric trucks within range of the original cost of trucks powered by other means.

Yearly savings from \$313 (one truck in one-shift operation) through \$14,860 (ten trucks in three-

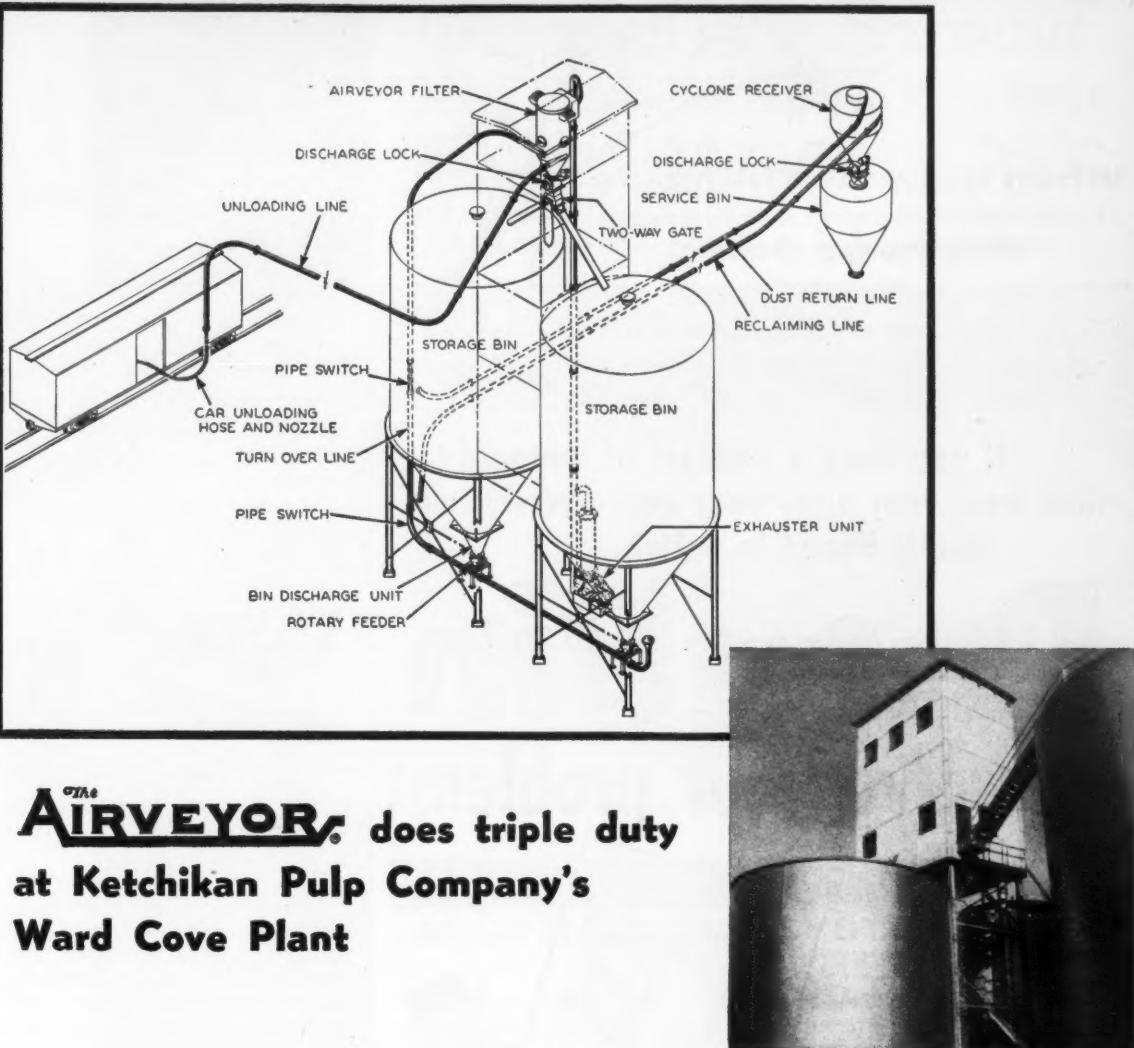


Batteries for electric trucks are available through leasing plan

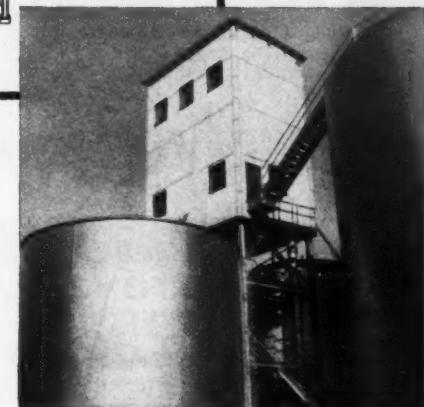
shift operation) have been attained by electric truck users because maintenance, repairs and depreciation of electric trucks are generally less than those operated from other power sources. Cost of charging current plus cost of leasing battery and charger for electric trucks is comparable to cost of fuel and oil for trucks of other types. Thus, leasing plans permit purchasers, in effect, to pay for their power as they use it, just as users of other types of trucks purchase fuel and oil as needed.

Elimination of cash outlays for battery and charger by means of leasing plans reduces average initial cost of an electric truck chassis, battery and charger by approximately \$2800. Lease-purchasers taking advantage of the lower overall ownership and operation costs of electric trucks avoid large investments of working capital.

(Leased batteries and chargers are available from Exide Industrial Div., The Electric Storage Battery Co., Dept. CP, Philadelphia 2, Pa. . . or for more information reader may simply check CP 3651 on Reader Service slip which is located opposite last page.)



AIRVEYOR does triple duty at Ketchikan Pulp Company's Ward Cove Plant



Again, this time away up in Alaska, the Airveyor goes to work for Ketchikan Pulp Company in its new \$50 million plant at Ward Cove. This single Airveyor system handles all incoming bulk magnesium oxide—unloads from box cars, delivering to two storage bins . . . reclaims from either bin for transfer to a day bin . . . recirculates from one storage bin to another, if desired. Conveying rate, for any of these operations, is 10 tons an hour—fast, clean, efficient conveying all the way, from cars to process.

Ward Cove plant, the first major industrial plant in Alaska, has a daily production of 300 tons of high quality chemical cellulose, and is shipped to the United States and world-wide markets.

Many pulp and paper mills in this country and Canada use the Airveyor for the handling of their mill-supply chemicals, due to its inherent ability to perform, day in and day out, efficiently and with minimum attention and maintenance expense.

Over a quarter of a century of experience in air-conveying goes into every job. Fuller engineers are well qualified to make a thorough study of your conveying problems, and recommend equipment best suited to solve your needs, efficiently and economically. If interested in less costly materials handling, ask for an engineering study. We'll be glad to make our recommendations and you are under no obligation whatever for this service.



Fuller

...pioneers in harnessing AIR

FULLER COMPANY
136 Bridge St., Catawba, Pa.
GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY
Chicago • San Francisco • Los Angeles • Seattle • Birmingham

A-205
1476

When inquiring check CP 3652 opposite last page

When materials hang-up

Profits go down!

How much is down-time, due to material hang-up in bins, costing you?

If you have a problem of material flow from your bins, your entire production line is bound to suffer.

PneuBin can solve your problem!

- Safe
- Economical
- Quiet

PneuBin panels are a new concept in bin-stored material activation. The PneuBin panel is a steel-backed, Neoprene diaphragm mounted on the inside walls of your present bins. This PneuBin panel, operating off your regular plant air supply is inflated and deflated in cycles, positively displacing the bin contents to activation. This positive displacement assures constant free flow of materials . . . eliminates bridging, funneling and caking.

PneuBin engineers will gladly make no-obligation recommendations on your specific material handling problems. Write for FREE literature and "Flow Stoppage Report."

GEROTOR MAY CORPORATION

1527 MARYLAND AVENUE, BALTIMORE 3, MARYLAND



When inquiring check CP 3653 opposite last page

MATERIAL HANDLING

Carrier handles VIP's with speed, comfort and safety . . .

electric unit carries 2000 lb at up to 6 mph

Uses: For interplant personnel movements such as plant tours or inspection trips. Unit is also useful for miscellaneous freight handling or servicing soft drink vending machines.

Features: Carrier handles one-ton load at speeds to 6 mph.



Battery-powered unit is quiet and fume-free

Description: Truck deck is 54 x 48", 9½" off floor. Unit is equipped with four removable air cushion seats. Operator can stand or sit on battery compartment. Three-speed controls and brake are on floor, leaving operator's hands free for steering. Battery-powered truck is quiet and fume-free.

(Personnel carrier is product of Lewis-Shepard Products, Inc., Dept. CP, 193 Walnut St., Watertown, Mass. Check CP 3654 on form opposite last page.)

All about air conveying

Printed in two colors, 16-page illustrated bulletin explains how and where pneumatic conveying can be used to advantage. Numerous installations are pictured and sketched. List of materials with recommended handling method is included.

Bul G-2 is issued by Fuller Co., Dept. CP, Catasauqua, Pa. When inquiring specify CP 3655 on form opposite last page.



Jars, pots, tanks, etc. made from "U.S." Chemical Porcelain are leak-proof, mechanically strong, dense and of virtual zero porosity. They are completely inert to all chemicals except hydrofluoric acid and hot caustics. And porcelain contains no iron to be absorbed—no induced contamination! Its non-aging characteristics make for long, maintenance-free service life. No-seam construction, rounded corners and smooth lustrous white glazed surfaces provide for quick, easy cleaning.

Our complete Chemical Porcelain line of jars, pots and tanks includes a wide variety of stock items in capacities ranging from 2½ to 200 gals.

WRITE TODAY—ask for BULLETIN 410

U.S. STONWARE Process Equipment Div. Akron 9, Ohio

When inquiring check CP 3656 opposite last page

FREE TEST CAN
SAMPLE CAN shows how C-5 solves
"HIGH-TEMP" THREAD PROBLEMS!

Prove it to your own satisfaction that C-5 ENDS STUD SEIZING AND GALLING EVEN AT 1800°F

Leading petroleum processors are now using C-5 for flange bolts, studs, and all other threaded surfaces on reactors, cat crackers, autoclaves, heating exchangers, catalytic reformers, pumps and valves, etc., and other applications where temperatures are up to 1800°F. Fel-Pro's exclusive C-5 colloidal copper formula "copper-plates" metal . . . gives maximum cushioning and protection to 1800°F. without breakdown.

C-5 prevents galvanic action—eliminates pitting even where dissimilar metals are joined . . . protects all threaded surfaces, insuring their repeated re-use!



Write today for your FREE Test Sample CAN. Fel-Pro Products Mfg. Co., 1515 Carroll Ave., Chicago 7, Ill.

C-5
fel-pro
"HIGH-TEMP"
✓ Prevents Stud Breakage
✓ Ends Stainless "Pitting"
✓ Reduces Torque
✓ Speeds Disassembly

ANTI-SEIZE THREAD COMPOUND

When inquiring check CP 3657 opposite last page

MATERIAL HANDLING

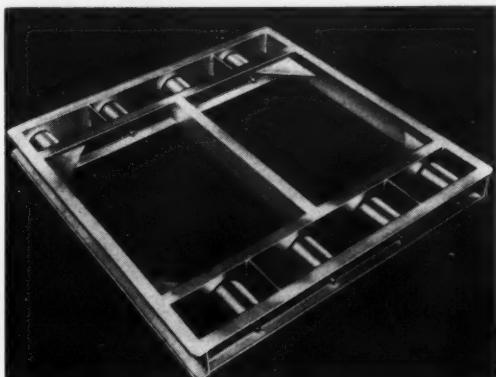
Maximum strength — minimum weight provided by magnesium dolly . . .

pallet dollies are available in six sizes and capacities of one or two tons

Uses: Dolly permits one-man handling of boxes, crates, or similar containers.

Features: Magnesium construction reduces weight to 31 to 42 lb, depending on size.

Description: Dollies are fabricated of welded magnesium channels, fully stress-relieved. Units are furnished with 3½"-diam rollers equipped with ball bearings and steel axles. Roller spacing may be even, or staggered, as required. Pallet dollies are available in six standard sizes and in capacities of 2000 or 4000 lb. Special sizes may be had on request.



Lightweight dollies permit one-man handling of heavy boxes and crates

(Magnesium dollies are produced by Magline, Inc., Dept. CP, 1900 Mercer St., Pinconning, Mich. . . or for more information reader may simply check CP 3658 on Reader Service slip which is located opposite last page.)

Shows handling techniques in ten industries

Illustrations of unusual uses of fork trucks and descriptions of new equipment are contained in 24-page booklet. More than 50 photographs illustrate "case histories" of material handling techniques used to handle scrap, lumber, chemical supplies, synthetic rubber. Equipment described includes line of battery-powered, high-stacking hand trucks.

Material Handling News is issued by Clark Equipment Co., Dept. CP, Battle Creek, Michigan. When inquiring specify CP 3659 on form opposite last page.

another great
advance in
economy for
BULK MATERIAL
shippers!



TOTE* SYSTEM now offers the **NEW, TESTED** **Container Car**

Permits rail shipments of bulk materials without freight costs on forwarding and return of Tote Containers.

here's how this **MODERN COMPLETE BULK HANDLING SYSTEM** saves you money!

Tote System is a **complete** bulk material handling system built around sturdy aluminum containers, plus automatic filling and discharging equipment. It is now being used by hundreds of manufacturers and processors for inter-plant shipment of bulk materials; for in-plant storage and handling; and for accurate and automatic weighing, mixing and blending.

Tote System **SAVES** time and labor . . . container costs . . . losses due to contamination and deterioration . . . losses due to breakage, spillage and sifting . . . losses due to rodents, insects and weather. Tote System also **SAVES** investment in expensive fixed storage and conveying equipment. Its flexibility and adaptability to changes in plant layout is unmatched.

and now, with the new **CONTAINER CAR**

It is possible to make long haul shipments of bulk materials in unit containers without any freight costs on the containers themselves . . . to make mixed or split shipments of various bulk materials . . . to simplify shipments to off-rail users.

Tote System engineers are available to help you fit these developments to your specific application. Write at once without obligation.

LOAD IT
TRANSPORT IT
DISCHARGE IT

*Tote and Tote System Reg. U. S. Pat. Off.

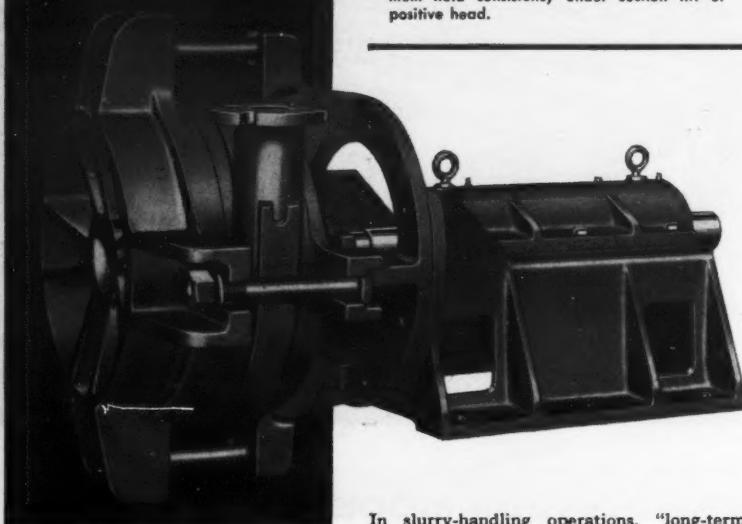
TOTE SYSTEM, incorporated

680 So. 7th

Bentrice, Nebraska

When inquiring check CP 3660 opposite last page

For Continuous Heavy-Duty Pumping



The Morris Type RX Pump shown below is a heavy-duty, low-speed all metal slurry pump expressly designed to handle abrasive slurries, chemical sludges, plant wastes etc. up to maximum fluid consistency under suction lift or positive head.

MORRIS TYPE RX SLURRY PUMP

• Free Service. Morris Engineers will be glad to recommend the pump best suited to your needs for size, capacity, etc. Send necessary data today . . . include request for Bulletin 185.

MORRIS
CENTRIFUGAL
PUMPS

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

When inquiring check CP 3661 opposite last page

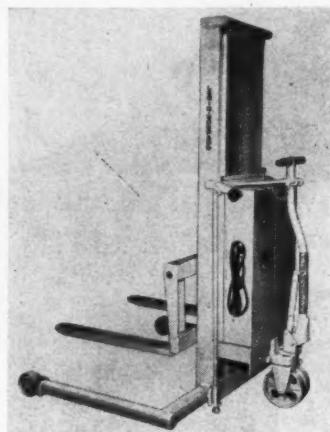
MATERIAL HANDLING

Lifts skids or pallets to height of 58" . . .

stacker lifts half-ton load at rate of 25 fpm

Uses: Handling of skid platforms or pallets in small plants and warehouses or to supplement heavier equipment in larger operations. Capacity of truck is one half ton.

Features: Truck can be pushed, pulled, or steered with handle locked in vertical position — aiding maneuvering in extremely narrow aisles. When machine is used as lift truck, handle is unlocked and used in normal pulling position.



Handle may be locked in vertical position for maneuvering in narrow aisles

Description: Unit, of 1000-lb capacity, is available as either platform truck for skids or straddle truck for pallet handling. Stacker lifts capacity load to height of 58" at speed of 25 feet per minute. It can handle pallets up to 48 x 48".

Built-in battery and charger supply power for raising and lowering loads. This hand stacker truck is equipped with hand-operated floor locks.

(Stacker is manufactured by Lewis-Shepard Products, Inc., Dept. CP, Watertown, Mass. . . or for more information reader may simply check CP 3662 on form which is located opposite last page.)

DEPENDABLE QUALITY!

Order direct
with
confidence

"Metalsmiths" Stainless Steel and Monel Utensils

METALSMITHS Utensils are built to the exacting needs of corrosion-resistant service in the process industries. Efficiently designed—made of correct metal analysis and weight—fabricated by latest techniques—backed by over 30 years' specialization in corrosion-resistant equipment.

Prompt shipment
—anywhere!

WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS

Division of Orange Roller Bearing Co., Inc.

556 White Street Orange, N. J.

When inquiring check CP 3663 opposite last page

NO MATTER WHAT YOUR LEAKING JOINT PROBLEMS ARE



Leak Lock clings in tough films
that stretch rather than break

For 5 years, Leak Lock has been surprising skeptical people who didn't expect to find a "barrier" for an "impossible-to-hold" material. They were surprised at the broad scope of its capabilities.

Leak Lock is being ordered regularly by a well-diversified list of important concerns who regard it as a "find" for special uses.

Send for information and a sample. And here's a tip: Don't depend on a lab. test. Try it on the actual job, and then you will know.

Leak Lock

STEWART INDUSTRIES, INC.
(FORMERLY HIGHSIDE CHEMICALS CO.)
16 COLFAX AVENUE CLIFTON, N. J.

When inquiring check CP 3664 opposite last page

CHEMICAL PROCESSING

Unit discharges bulk materials into ground-level grills or 15 feet in air . . .

hydraulically controlled body can handle up to one ton per minute

Uses: Handling or delivery of free flowing granular or similar materials.

Features: Two methods of delivery are possible: directly into grills or hoppers or onto ground, and from swivel conveyor atop body. Conveyor can discharge up to 15 feet above ground.

Description: Unit is available in lengths from 10 to 34 feet, truck or trailer mounted, with chain and flight or belt discharge. Full hydraulic opera-



Unit can deliver into grills or onto ground, or from swivel conveyor atop body

tion is controlled from rear-of-body position. Two control valves are found at rear left side of body. One valve controls speed of body conveyor and cross feed auger. Other valve controls speed of vertical and discharge augers. Hand-operated pump elevates discharge stack into position. Swing of the stack is manually controlled by crank-and-gear arrangement. Unit can unload up to one ton/min, depending on material.

(Model SF-5 bulk material body is manufactured by Baughman Mfg. Co., Dept. CP, Jerseyville, Ill. . . or check CP 3665 on form opposite last page.)

Profiles industrial truck

Four-page folder is designed to provide full facts on industrial fork truck. A specific series is covered — 5000-lb-capacity gasoline, LPG or diesel. Folder includes specifications, operating data, and schematic drawings and diagrams.

"Fact Folder" is issued by Towmotor Corp., Dept. CP, 1226 E. 152nd Street, Cleveland 10, Ohio. Check CP 3666 opposite last page.

LOWER COST PER TON-MILE

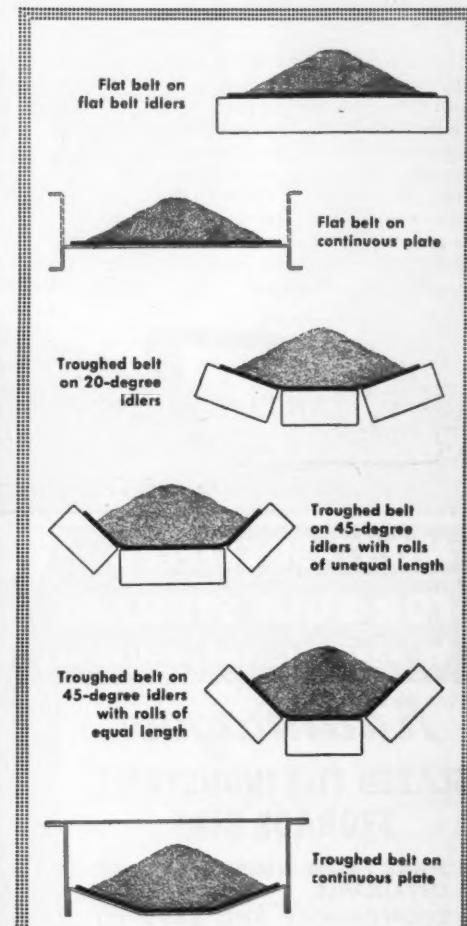
... yours with either a Link-Belt single belt conveyor or complete system

WHETHER you need a single belt conveyor or complete system, you'll find that Link-Belt engineering and equipment add up to lower cost per ton mile. Drawing from vast experience, our engineers can develop a system incorporating the most practical components from our complete line of quality idlers, trippers, drives, terminal machinery and other items. And if desired, we will handle erection.

Link-Belt has pioneered the development of belt conveyors for short or long hauls . . . indoor or outdoor service. To learn how this background can produce utmost economy per ton-mile in handling your bulk material, call your Link-Belt office.



Enough chips ride this Link-Belt 36-in. wide belt conveyor to produce 250 tons of kraft paper per day. Maximum chip capacity results from use of 45-degree belt idlers.



The load carrying capacity of belt conveyors is determined by the width of the belt, the shape of its loaded cross section, and the angle of repose of the material being carried. Link-Belt offers you one source for all belt conveyor components—including 500 idler sizes in 35 types . . . plus pulleys, drives, trippers and supports.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

12.37

When inquiring check CP 3667 opposite last page



**EFFECTIVE, ALL-DIRECTIONAL
MOVES GRANULAR
OR WET MATERIAL
NOISELESSLY**

The simplest, most quiet answer for moving materials in hoppers, chutes and bins. One moving part, no lubrication, no maintenance, never harms the equipment on which it is mounted. Instantly self-starting every time. Vibrolator is the only vibrator that can guarantee this regardless of operating conditions. Write for catalog. You will also receive form for describing your problem. No obligation!

VIBROLATORS®

©Vibrolator is a registered trade name and applies only to the patented Peterson Vibrolator.

MARTIN ENGINEERING COMPANY
155 KEMP ST. NEPONSET, ILL.

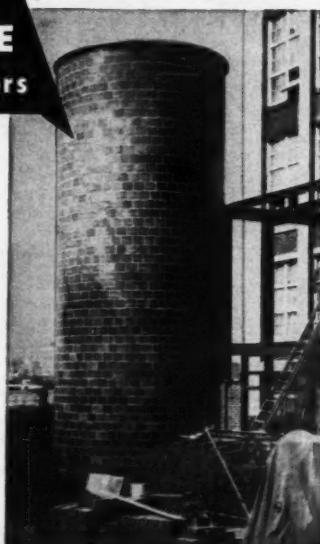
When inquiring check CP 3668 opposite last page

**MOST-SPECIFIED
FOR BULK STORAGE
by engineers and contractors**

**Kalamazoo
GLAZED TILE INDUSTRIAL
STORAGE BINS**

- MADE FROM FINEST FIRE CLAY OBTAINABLE
- ECONOMICAL AND EASY TO ERECT
- HEAVY, MONOLITHIC CONSTRUCTION
- WEATHER PROOF, FIRE PROOF, CORROSION PROOF
- MAXIMUM PROTECTION FOR CONTENTS against freezing, condensation, spoilage, contamination
- LONG-LIVED . . . outlast most buildings.

INDUSTRIAL STORAGE BIN DIVISION



*It will pay you to get
the Kalamazoo story*

Kalamazoo TANK and SILO COMPANY

245 HARRISON STREET • KALAMAZOO, MICHIGAN

When inquiring check CP 3669 opposite last page

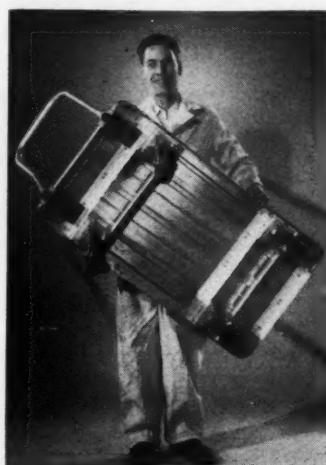
MATERIAL HANDLING

Extruded aluminum sections serve as truck bed and frame

Uses: Lightweight truck is suited for manual handling of materials, tractor-towed trains, or towing conveyors.

Features: Truck, constructed of extruded aluminum sections, eliminates separate frame and bed — weighs less than trucks of conventional construction.

Description: Units are available with beds of "hat" sections or, for heavier loads, "inverted W" sections. Trucks come in widths from 24 to 48" in 6" in-



Truck, of extruded aluminum, eliminates separate bed and frame

crements and lengths from 30 to 72" in 6" increments. Capacities to 3600 lb, depending on casters and wheels.

(Aluminum trucks are manufactured by Tobey Aluminum Div., Magnesium Company of America, Dept. CP, East Chicago, Indiana. Check CP 3670 opp. last page.)

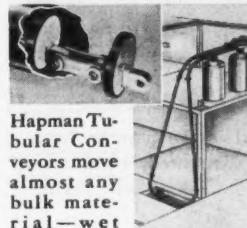
Your guide . . . to more material handling ideas and equipment is the alphabetical product directory beginning on page 222 in this issue

HERE'S HELP

THAT SOLVES TROUBLESOME
BULK HANDLING PROBLEMS:

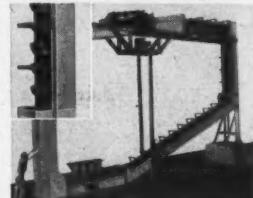
Hapman

Tubular and Pivoted Bucket Conveyors



Hapman Tubular Conveyors move almost any bulk material—wet or dry—through any plane or angle. They're dust, liquid and odor-tight. Investigate!

WRITE for Bulletin T-C26



Exclusive top loading device on Pivoted Bucket Carrier handles fragile materials gently. Many other unique advantages.

WRITE for Bulletin P-C26

Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY

KALAMAZOO MICHIGAN
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check CP 3671 opposite last page

CUT PUMPING COSTS WITH

JABSCO 

**INDUSTRIAL
PUMPS**



Model 3600-01
Portable Plastic Pump
and Motor Unit
316 S.S. Shaft—Carbon
Bearings



- INSTANTLY SELF-PRIMING
- SIMPLE, COMPACT, ONLY ONE MOVING PART
- DURABLE NEOPRENE IMPELLER
- SELF-LUBRICATED
- TROUBLE-FREE OPERATION

HERE'S another Jabisco industrial pump — designed and built for chemical, pharmaceutical and other industrial applications. Ideal for transfer of various liquids and acids—sump drainage, coolant pumping, general transfer, pulp in solution, filtering, brines, plating solutions—even fluids containing foreign matter or particles, silt, crystals, and other gritty materials. Bronze, stainless steel or plastic construction is available to solve your specific pumping problems.

Pumps either light or heavy viscous liquids. Temperature ranges from 35° to 180° F. Write for a Jabisco factory recommendation for your own needs. Specify application, fluid pumped, temperature, pressure, etc.

FREE — send for catalog sheets, detailed information . . . no obligation, of course!

JABSCO PUMP COMPANY

2031 Lincoln Street, Burbank, California

When inquiring check CP 3672 opposite last page

CHEMICAL PROCESSING

MATERIAL HANDLING



DARNELL

for chemical plants

...OVER 4000 TYPES of CASTERS & WHEELS

All types of rubber treads - soft, medium and hard - for smooth operation on all kinds of floors. Featuring Neoprene rubber treads - resistant to steam, water, oxidation, oils and waxes and unaffected by most chemicals - expertly compounded to Darnell standards in our own rubber factory.

1. LONGER EQUIPMENT LIFE

2. GREATER FLOOR PROTECTION

3. EASY EQUIPMENT MOVABILITY

All Darnell Casters, whether steel or rubber tread, are available with various top plates, stems and fittings for any type of application. Or, Darnell engineers will gladly design a special type caster for your own individual equipment. Demand Darnell for Dependability.

Get your
FREE COPY today!

This little book
saves time and money

DARNELL CORPORATION,
LTD.

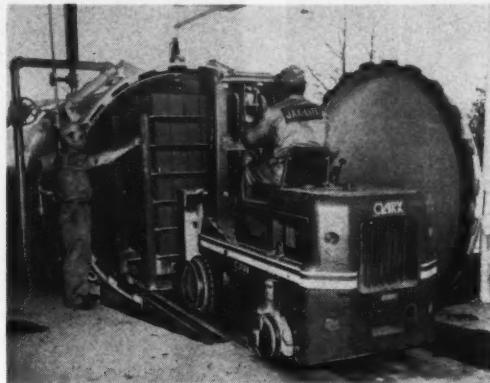
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA
60 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check CP 3673
opposite last page

Flanged wheels on fork truck allow it to travel on rails

Flanged wheels fixed to regular fork truck permit it to travel on autoclave rails, giving added flexibility to the fork truck fleet at Jackson Ready-Mix Concrete, Jackson, Miss.

To move racks of concrete blocks into its 100 ft long autoclave for high pressure steam curing, the



Fork truck travels on rails to move racks of concrete blocks into autoclave

company rigged two pairs of steel flanged wheels on one of its fork trucks. Unit travels on rails set in floor of autoclave.

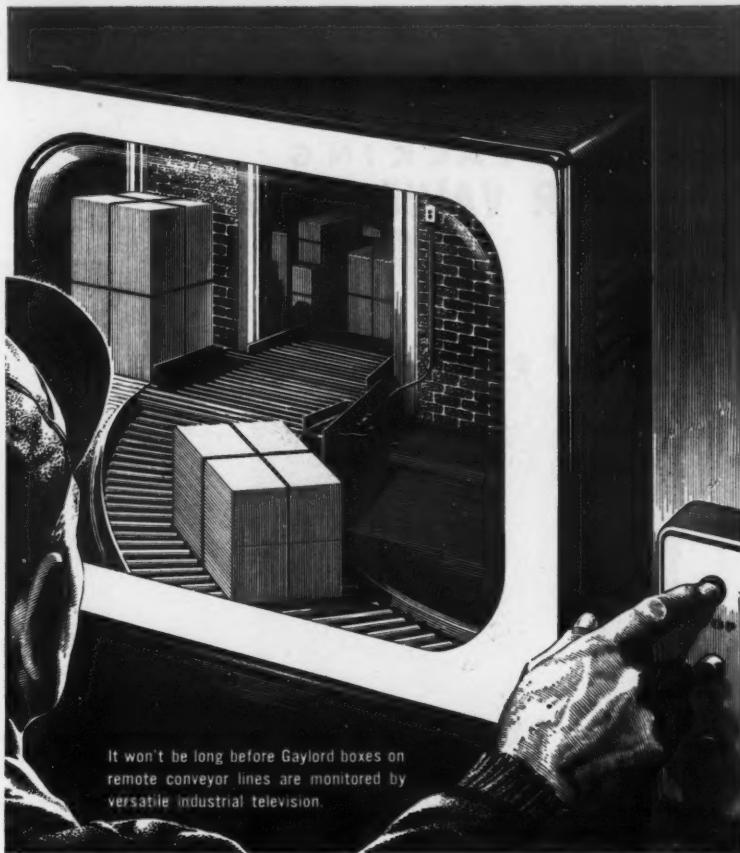
Front flanged wheels are bolted to regular wheels. Rear flanged wheels are supported in a "U" block which is bolted to the fork truck frame in direct alignment with regular wheels. Flanged wheels clear floor by several inches when fork truck is traveling in normal manner. Modification costs about \$250.

(Flanged wheel truck is a modification of the Clark Utilitruk, manufactured by Clark Equipment Co., Dept. CP, Battlecreek, Mich. . . check CP 3674 on form opposite last page.)

Pictures six types of bagging scale

Printed in two colors, six-page, fold-out bulletin illustrates six types of bagging scale, describes them with specifications, and shows engineering drawings of basic designs. All special features are described.

Bul 8246A is issued by Richardson Scale Co., Dept. CP, Clifton, N. J. When inquiring specify CP 3675 on form opposite last page.



WELL-BEHAVED BOXES...



CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

...are vital to modern, mechanized handling methods. As operations become more automatic, interruptions are more costly. Precision-built Gaylord containers are dimensionally accurate and structurally strong to speed packing and handling... prevent jam-ups.

Gaylord container specialists will be glad to work with you in selecting or developing "well-behaved boxes"... for maximum manpower-saving efficiency. Call your nearby Gaylord office.

GAYLORD CONTAINER CORPORATION • ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check CP 3676 opposite last page

SAVE

ON PACKING
PAPER VALVE BAGS



CODDINGTON

AUGER-MATIC

T. M. Reg.

**IT SHAKES AND SETTLES
AS IT FILLS AND WEIGHS**

Cut production costs by packaging modern valve bags with an AUGER-MATIC. It fills them quickly to desired weight... it shakes and settles fluffy materials... shuts off automatically.

Valve bags fit snugly on AUGER-MATIC spout so no dust escapes... keeps bags clean... eliminates costly tying or bag closing equipment.

AUGER-MATIC Bag Packer is equipped with multiple auger... packs any materials from powder to pellets. Easily moved from one filling point to another.



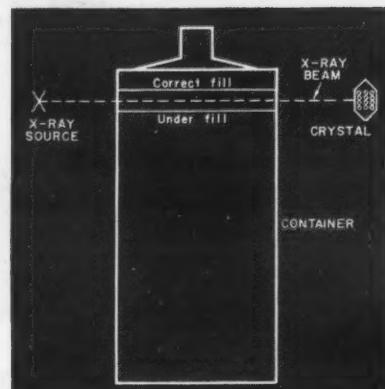
**Send for FREE Brochure.
It costs less to pack with
an Auger-Matic Bag
Packer.**

E. D. CODDINGTON MFG. CO.

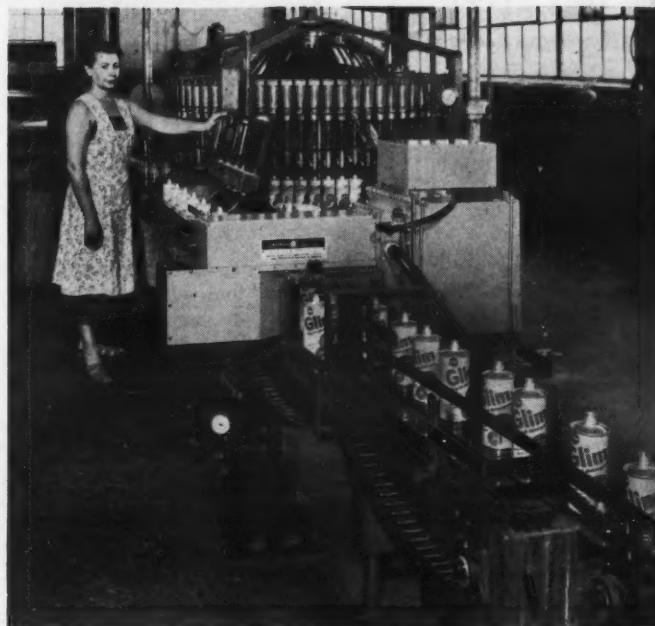
5036 N. 37TH STREET • MILWAUKEE 9, WISCONSIN

When inquiring check CP 3677 opposite last page

packaging



Device responds to underfill when liquid level drops to the point where X-ray beam can pass. Under different conditions, equipment can be used to check for overfill



Self-contained device occupies relatively small space on packaging line... can be adjusted for various level-checking problems

**Switch from glass to metal containers made level control the paramount problem in filling
B. T. Babbitt's cleanser — "Glim".
X-ray inspection...**

***holds fill level to 1/32",
with no jam-ups***

By **BILL SCHREMP**, Assistant Editor
with **IRA MENDLESON**, Plant Manager
B. T. Babbitt, Inc.
Albany, New York

Problem: When expanded production demanded a change in container styling and capacity, B. T. Babbitt decided to package its liquid household detergent, "Glim" in a metal can. While this solved many problems of breakage and labeling, new problems of filling and level checking appeared.

Level checking, which had never been a difficult task before, became an acute headache. Glass

bottles were always filled to the neck — customer could check full measure at a glance. With opaque can, accurate measure became a serious problem. Line speeds exceeded 150 cans per minute — mechanical weighing equipment seemed impractical.

Solution: Babbitt decided to install an X-ray level checking device. Unit chosen is capable of checking up to 900 cans per minute, provided that cans can be removed from the line fast enough. It measures without physical contact with the can. A narrow X-ray beam is flashed through the cans and, if fill is inaccurate, reject mechanism is triggered. This knocks can off the line. However, in this case, uncapped Glim cans demanded a more gentle rejection to avoid spillage.

"Another product safely shipped in Inland 'protection-eered'* Containers"



Detail of Babbitt's ejection device . . . If fill is inaccurate, reject arm (arrow) is triggered, pushing culprit can to far conveyor

Working in co-operation with General Electric and Conveyor Systems, Inc., of Chicago, Babbitt developed a practical rejector.

Basically, rejector is a dual conveyor having a small air-actuated swinging gate at inspection point. Underfilled can passing through X-ray beam initiates a rejection signal. This signal operates a conventional solenoid valve, admitting air to reject gate cylinder. Rejected can is then pushed sidewise onto parallel reject conveyor. After a number of rejects have accumulated, operator returns them to filling machine. This also spots any leaking cans or cans which did not fill at all.

Other than switching on and off, device needs little attention and no operator control. Only moving part is the shutter that controls X-ray beam. Unit requires little or no conveyor adaptation. It works in conjunction with present equipment.

Results: Babbitt has maintained extremely high filling accuracy with X-ray level checkers. Units respond to level variation as small as $1/32"$. In practice, however, accuracy depends on smoothness of travel as conveyor line presents cans for inspection.

Another difficulty eliminated by the device is jam of cans that could have resulted from weighing equipment failures. With up to four cans per second moving into weighing unit, a jam not immediately halted by an attendant could be fol-

(Please turn to page 133)



flower with a **KNOCKOUT** punch

The knockout punch in your household "bug-bomb" comes, believe it or not, from a delicate little flower that blankets the hilly slopes of Kenya in Africa. Man's oldest insecticide, the pyrethrum flower was used first by ancient Persians. And modern science still hasn't been able to improve on its ability to knock out bugs fast.

Nobody knows pyrethrum like the Minneapolis firm of McLaughlin Gormley King Co. They've been processing the flowers for over forty years. And for a good part of that time they wrestled with problems in packaging the liquid pyrethrum concentrate they ship to insecticide manufacturers. Because a single drum of pyrethrum extract may cost over \$3,500, a container that leaked or allowed contamination of

the product was a king-sized headache.

Some time ago they asked an Inland Steel Container man for help. Our laboratory came up with the answer in the form of a special baked-on lining that, at last, made it possible for MGK to ship safely in steel drums . . . and get the benefits of strength and economy only this type of packaging provides.

Now . . . **ABOUT YOU.** Whatever you make, and no matter how carefully you make it, the follow-through of good packaging is all-important. Chances are that steel packaging by Inland can solve your problems once and for all. For the last word on new developments you can use, write Bob Boeher, Dept. 310C

**the right container, with the right lining for your product*



INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company • 6532 South Menard Avenue • Chicago 38, Illinois • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio

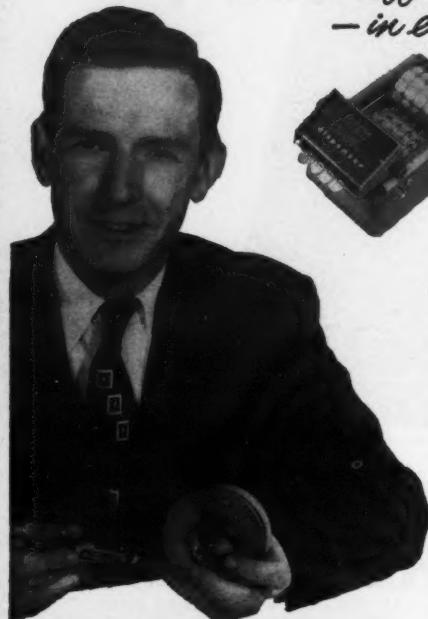
Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

When inquiring check CP 3678 opposite last page

Avery pressure-sensitive Labels are easy and fast to use —and they're priced right!

Here's fast, clean, economical labeling. All waste motions are eliminated—for unlike ordinary labels, Avery pressure-sensitive Labels are applied dry. One simple motion—a fingertip pressure—and Avery pressure-sensitive Labels are on in an instant...without moistening! Clean, easy application even on hard-to-label surfaces...they won't dry out, pop or peel...and they stay neat and attractive even under temperature and humidity extremes.

*"what a difference they make
—in every department!"*

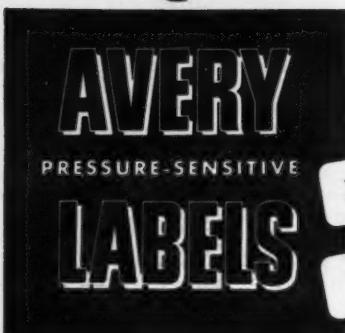


PRODUCTION LABELING
SIMPLIFIED WITH NEW
AVERY "55" ELECTRIC
DISPENSER

Even more labeling efficiency is now available with this new Avery "55" Electric Dispenser. Every time one label is used, another pops out—automatically! No matter how fast, this new dispenser easily keeps pace with labeling operations including speed ups and delays—without adjustment—actually pays for itself with time and money saved!

DID YOU KNOW?.....

that Avery originated pressure-sensitive labeling back in 1935? The benefit of years of experience in solving the requirements and problems of many industries, is at your service to help you develop a low-cost, economical labeling operation. There's no obligation...just explain your problems to your Avery representative—write or call the nearest Avery office listed in the yellow section of your telephone directory!



Send me free samples and information on Avery Pressure-Sensitive Labels.

I'd like to know more about the new "55" dispenser.

Please have the Avery man call.

AVERY ADHESIVE LABEL CORP., Custom Div. 123
1616 S. California Ave., Monrovia, Calif.
117 Liberty Street, New York 6
608 S. Dearborn Street, Chicago 5

name _____

address _____

city _____ state _____

our business is _____

When inquiring check CP 3679 opposite last page

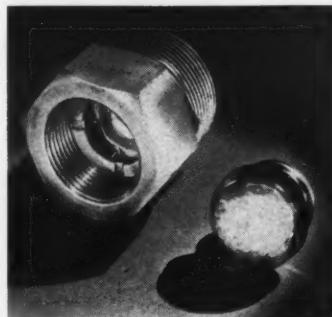
PACKAGING

Offers visual check on humidity . . .

blue silica gel turns pink as moisture is absorbed

Uses: For special packaging applications involving pressure or vacuum and requiring visual means of checking on humidity conditions within container.

Features: Indicator contains



Indicator mounts in housing attached to metal container, providing visual moisture check yet maintaining pressure or vacuum

silica gel, normally blue, which turns pink as critical humidity level is reached.

Description: Device is fitted into metal housing to be attached to container shell. Tight seal against moisture infiltration or loss of pressure or vacuum is provided, yet air within container circulates freely through indicating material by way of holes in back of the receptacle, permitting visual check on conditions without opening package.

("Bull's Eye Indicator" is product of Davison Chemical Div. of W. R. Grace & Co., Dept. CP, 101 N. Charles St., Baltimore 3, Md. Check CP 3680 opposite last page.)

This month's Processing and
Engineering Data section
starts on page 208

Dependable Accuracy for Sacking, Checkweighing



MODEL 2229 SACKING SCALE

Exact Weight sacking scales bag, weigh and checkweigh at the same time. Magnified indication on easy-to-read dial assures correct weight with constant check on every bag. Easy to operate—just two controls. Models available for overhead, stationary floor or portable installation.



MODEL 1120 SCALE FOR CHECKWEIGHING

The ideal scale for checkweighing bags where sackers do not have visible over and under weight indication. Easy-to-read dial on inclined tower provides 2" of travel equivalent to 16 ounces over and under. Short lever fall with adjustable hydraulic damping mechanism assures speed and accuracy. Model shown is 150 lb. capacity. Others available to meet any requirements.

Sales and Service Coast to Coast

Exact Weight
Better quality control
Scales
Better cost-control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P.O. Box 179, Station S, Toronto 18, Ont.

When inquiring check CP 3681 opposite last page

CHEMICAL PROCESSING

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LEVEL CHECKER

(Continued from page 131)

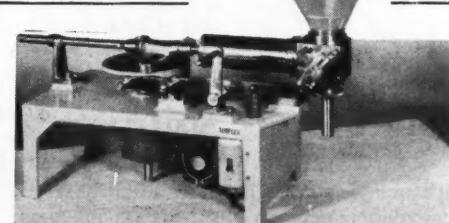
lowed by a virtual hail of cans. With X-ray checking, however, a failure of unit would not interfere with flow of production line — no mechanical contact is involved.

(Hytafill level checking device is manufactured by X-Ray Department, General Electric Co., 4855 Electric Ave., Milwaukee 1, Wisc. . . or for more information about this product reader may simply check CP 3682 on convenient Reader Service slip located opposite last page.)

Explains advantages of films for packaging

Two-color folder reports on film packaging applications in foods, pharmaceuticals, clothing, industrial products. It describes advantages of this type of packaging. Properties of polyethylene are also reviewed.

"Here's How it Pays" is issued by Bakelite Co., Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N. Y. When inquiring specify CP 3683 on form opposite last page.



Semi-automatic Filler

. . . deposits one to 32 oz of many types of drug products into bottles, jars, and plastic containers. Single position unit, with acid-resistant contact parts, dispenses automatically at rate of 15 to 30 containers per minute. Designed where space is a consideration, it handles liquid and semi-solids. Unit dismantles for cleaning in less than five minutes.

("Simplex" Model A Filler is product of F. L. Burt Company, Dept. CP, 571 7th Street, San Francisco 3, Calif. . . or for more information check CP 3684 on form opposite last page.)



Versatile? Yes! These are Rheem steel pails. They are available in 1-gallon to 15-gallon sizes; plain, colored or lithographed; lined or unlined; double head or crimp lug type covers. To the many manufacturers who want clean steel pails, Rheem is the answer. You see, Rheem is the world's largest manufacturer of steel containers, and their experience is your assurance that your products are well protected—always. Rheem pail linings are bonded directly to the steel and oven baked by a special process to stay on. Use the coupon to find out more about sending your products to market, first class—in Rheem steel pails.

YOU CAN RELY ON  MANUFACTURING COMPANY

World's Largest Manufacturer of Steel Shipping Containers

LINDEN, N. J. AND SPARROWS POINT, MD., RICHMOND AND SOUTH GATE, CALIF., HOUSTON, CHICAGO, NEW YORK, NEW ORLEANS

RHEEM MANUFACTURING COMPANY
7600 S. Kedzie Ave., Chicago, Illinois

Please send me detailed information on Rheem Steel Pails.

NAME _____

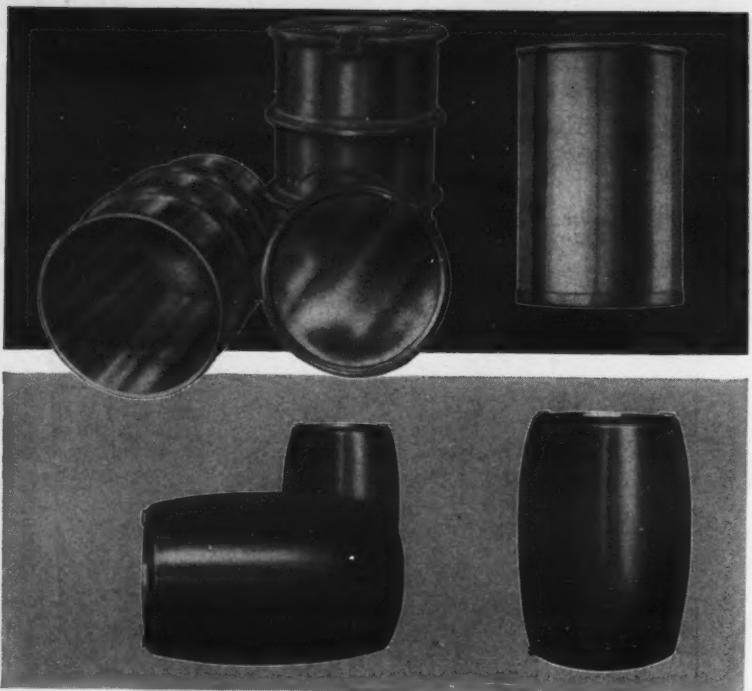
COMPANY _____

ADDRESS _____

CITY _____ STATE _____

CP-2

When inquiring check CP 3685 opposite last page



Tiptop product protection with Hackney drums and barrels

Strong acids—delicate chemicals—perishable foods—flammable petroleum products—tacky printer's ink—whatever your problem product—it can be shipped safely and securely in one of the many Hackney returnable containers. Constant research into the problems of transporting and storing liquids and solids such as these is your assurance that you can always get the best possible container for your purpose from Pressed Steel Tank Company. Our more than 50 years' experience in developing and producing rugged, heavy-duty Hackney drums and barrels has resulted in a complete line of returnable containers that are durable, readily cleaned, easily handled, low-cost shippers.

Hackney returnable containers for every need—

Tight head or removable head types. Straight or bilged walls. Entirely seamless barrels formed from a single sheet of metal. Two-piece drums with a single, strong, circumferential weld. Three-piece drums with seamless chime and crevice-free interiors. Materials available to suit the requirements of your product—including steel, stainless steel, nickel, nickel alloy, aluminum. Various capacities, up to 55 gallons, or 110 gallons for some models.

The Hackney drum and barrel catalog is full of details. Send for your copy today.

Pressed Steel Tank Company

1463 S. 66th St., Milwaukee 14, Wis. • Manufacturer of Hackney Products

52 Vanderbilt Avenue, Room 2087, New York 17, N.Y. • 235 Hanna Bldg., Cleveland 15, Ohio • 936 W. Peachtree St., N.W., Room 126, Atlanta 3, Ga. • 208 S. LaSalle St., Room 796, Chicago 4, Ill. • 568 Roosevelt Bldg., Los Angeles 17, Calif. • 4550 Main St., Room 210, Kansas City 6, Mo. • 144 Wallace Ave., Downingtown, Pa.



CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check CP 3686 opposite last page

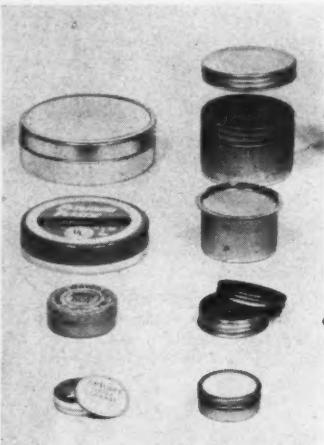
PACKAGING

Variety of cans useful for packaging, lab

Uses: Line of cans, ranging in capacity from $\frac{1}{4}$ to 16 oz, is designed for laboratory, production line, and packaging use.

Features: Seamless metal cans are light in weight, unbreakable.

Description: Line includes plain seamless slip cover or full open screw-top cans for products that do not require identifica-



Seamless metal cans are light-weight and unbreakable

tion. Decorated seamless cans can be lithographed to order, and special seamless cans made to individual specifications. Units are available with crimped lid, firmly holding label that can be specially printed. Full-open, screw-top cans are available in eight sizes from $\frac{1}{4}$ to 16 oz.

(Seamless metal cans are product of George D. Ellis & Sons, Inc., Dept. CP, American & Luzerne Streets, Philadelphia 40, Pa. . . . or check CP 3687 opp. last page.)

Your guide . . . to more packaging ideas and equipment is the alphabetical product directory beginning on page 222 in this issue

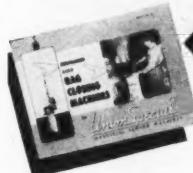
PORTABLE!
PRACTICAL!
PROFITABLE!

*Union
Special*®



SUSPENDED HEAD BAG CLOSING MACHINES

Portability, versatility, and simplicity of operation make Union Special Suspended Head Machines ideal for all-around bag closing operations in small plants, and well-suited for utility or stand-by duty in large plants. Users have found that machines can be used to produce neat, strong closures on virtually all types of paper or cloth bags. Initial cost is low; installation is simple and inexpensive. You can hang them up any place and go to work!



Send for this BULLETIN!

Get your copy of Bulletin No. 201 which illustrates and explains how *Union Special* Suspended Head Bag Closing Machines can supply the answer to bag closing problems in small plants and large operations. UNION SPECIAL MACHINE CO., 442 N. Franklin St., Chicago 10, Ill.

When inquiring check CP 3688 opposite last page



What's A "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

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PACKAGING

Straps boxes without removal from assembly line

Handles random box sizes without adjustment

Uses: For strap-sealing boxes or cartons. Particularly adapted to assembly line operations.

Features: Unit can be used on conveyor lines — is capable of strapping random-sized boxes without adjustment.

Description: Automatic strapping cycle is initiated by hand lever, pedal, or button, — or, with the addition of special equipment, by approach of



Seal random-sized boxes without separate adjustment

the article to be strapped. Unit will handle packages up to 20 by 22" girth and will cycle at the rate of 18 straps per minute. Other strapper models are available for boxes up to 52" square.

(Auto-Band Strapper is made by General Strapping Corp., Dept. CP, 100 Park Ave., New York 17, N. Y. . . or for more information check CP 3690 on form opposite last page.)

Characteristics and uses of cellophanes

Printed in two colors, fold-out bulletin describes characteristics and uses of three new cellophane films. New film designations have been included.

Bul 3178 is issued by Film Div., American Viscose Corp., Dept. CP, 1617 Pa Blvd., Philadelphia 3, Pa. Specify CP 3691 opposite last page.

STOP WASTE and SPOILAGE with C-line POLYLINERS

for CANS

for CARTONS

for DRUMS

CALL OR WRITE FOR FREE SAMPLES AND PRODUCTION — DELIVERY FACTS

You save packing time and capacity with service-proven C-LINE Polyethylene Liners; of special importance when plant costs and waste must be reduced to stabilize profits. C-LINE Poly Liners are odorless, tasteless, non-contaminating . . . water-proof, non-absorbent and resist most acids and alkalies. Leaking and caking is eliminated — your products reach the customer in a clean, dry state. C-LINE Poly Liners are economical to buy in any size you need — tough and long-lasting to use and re-use.

For immediate action, contact the C-LINE Personal Service Department, describing your products, containers and how shipped. We'll apply our complete facilities and experience (as a pioneer film converter) to provide and deliver on schedule, exactly the right C-LINE Poly Liner for your needs.

PLASTICS DIVISION
CANTON CONTAINERS, INC.
Canton 7, Ohio . . . Phone GL 5-5346

When inquiring check CP 3689 opposite last page

FEBRUARY, 1956

AIRLOCKS for DUST COLLECTORS



Large secondary dust collectors at National Lime and Stone Company, Carey, Ohio, are served by six Prater Rotary Airlocks. Photo courtesy Dustex Corporation.

PRATER ROTARY AIRLOCK FEEDER important in the process plan

... for increasing efficiency of dust collectors, bag filters and spray dryers. The closed-pocket rotor design with blades and side-plates as one unit, together with double shaft seals and extra sturdy construction, not only insures better air seal . . . it definitely means smoother and better operation of such equipment.

Available in 8, 10 and 12-inch sizes, the Prater Airlock Feeder saves money in handling practically any finely ground or granulated material including the most highly abrasive substances. Write for illustrated brochure.



CLOSED POCKET ROTOR
Side plates and rotor blades are cast as a single unit for better sealing and longer life. Recommended for both soft and abrasive materials.



OVERSIZED BEARINGS
Self-contained, extra large self-aligning bearings lubricated and sealed for life. Standard on all heavy duty Prater Rotary Airlock Feeders.



WHAT'S YOUR PROBLEM? jot down the details of your application and mail to us. Our engineers will help you plan your flow-sheet and specify proper equipment.

PRATER PULVERIZER COMPANY
1513 S. 55th Court, Chicago 50, Ill.

When inquiring check CP 3692 opposite last page



- Laboratory wares of all description.
- Platinum Metal Catalysts — Concentrated forms and on carriers.
- Electrodes, Stills, Retorts and other Special Process Equipment to order.
- Sheet, Wire, Tubing, Gauze and Fine Foils.
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PALLADIUM, IRIDIUM, OSMIUM, RHODIUM, RUTHENIUM, SILVER AND GOLD

We pay highest prices for scrap platinum and also have facilities for prompt recovery of spent platinum and palladium catalysts

WE INVITE YOUR INQUIRIES. OUR FOLDER CP-20 "PLATINUM, GOLD AND SILVER FOR SCIENCE INDUSTRY AND THE ARTS" WILL BE SENT ON REQUEST.

THE AMERICAN PLATINUM WORKS

231 NEW JERSEY R. R. AVE., NEWARK 5, N. J.

PRECIOUS METALS SINCE 1875

ENGEHLARD INDUSTRIES

When inquiring check CP 3693 opposite last page

for the laboratory

With today's fast pace of drug development, Squibb faced a mountain of work in bringing reserpine to a practical stage. While the tranquilizing effect of the drug is well-known, its metabolism in laboratory animals is not! Therefore with conventional bio-assay methods process development might have taken years. To solve its problems, Squibb Institute turned to . . .



RADIOISOTOPES for process development

Practical separation of active alkaloid from a mixture of 22 similar materials took only weeks to develop

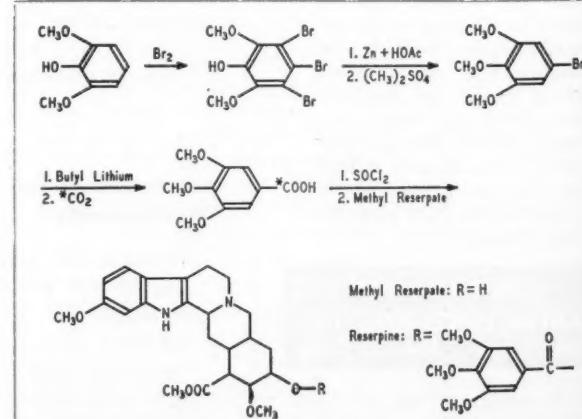
By WILLIAM C. CLARKE, Assistant Editor

Verified by DR. PAUL NUMEROV, Director
Radioisotope Laboratory
The Squibb Institute for Medical Research
New Brunswick, New Jersey

Problem: The Squibb Institute for Medical Research had to develop a process for isolating easily-hydrolyzed reserpine from twenty-one other alkaloids found with it in *Rauvolfia Serpentina*. All are complex molecules. Molecular structures and characteristic biochemical reactions have not been determined for many of these. And not much is known about animal metabolism of reserpine itself.

Conventional methods could have been used to develop an extraction process. But time consumed in setting up reliable bio-assays might have stretched

Medical action of reserpine is being studied in cardiovascular and mental disorders. Reserpine is thought to have suppressive action on portions of the brain. Symptoms of irritability, restlessness, fear, insomnia, hyperactivity may be suppressed. Reserpine may also aid in controlling schizophrenic reactions.



Methyl Reserpate: R = H

Reserpine: R = CC(=O)c1ccc(O)c(O)c1

"Hot" sample is placed in proportional-counter for activity check
CP Staff Photo

Counting gas from gas cylinder is fed to proportional-counter. Activity of sample is measured and fed to scaling unit. Timer is on scaling unit
CP Staff Photo



the project over years. Medical interest in reserpine demanded that a manufacturing process be found to allow medical evaluation quickly.

Solution: "Hot" carbon was the answer. Carbon-14 was introduced into reserpine molecule and isotope dilution assays, using distribution coefficients told the story. Extraction efficiencies were tested in a fraction of the time necessary for biological assays. Tests were not hampered by presence of other materials as in chemical analyses.

Small quantity of hard-to-get reserpine was hydrolyzed to methyl reserpate. (After treatment with thionyl chloride, the carbon-14 containing gallic acid trimethyl ether was esterified with methyl reserpate to give C-14 labeled reserpine.) "Hot" reserpine

(Please turn to page 139)

Alkaloids contained in *Rauwolfia Serpentina* include —

Ajmaline	RESERPINE	Methyl Reserpate
Ajmalinine	Sarpagine	Thebaine
Serpentine	Reserpine	Papavarine
Serpentinine	delta-Yohimbine	Serpine
Isoajmaline	Corynanthine	Rescinnamine
Neojmaline	Isorauhimbine	Reserpiline
Rauwolfinine	Yohimbine	Serpinine

This CEC 21-610 Mass Spectrometer, trailer-borne right to the drilling site, "smells" a 100,000,000-year old trace of oil . . . does it day-in, day-out for Hycalog, Inc., well-logging firm of Shreveport, La. Samples of drilling mud are analyzed for traces of gas dissolved or entrapped in the mud and cuttings. Presence of gas is a reliable indication that an oil "pay zone" is being approached, and the mass spectrometer's unusual sensitivity . . . it can detect ten parts per million of hydrocarbon gas . . . helps make sure that no potential oil reserve is passed by. "Hycalogging", the service supplied by this progressive company, is one more way that the mass spectrometer, already valuable in research and process control, serves the petroleum and petrochemical industries.

For process-stream analysis, for laboratory control, for leak detection . . . CEC offers two industrial mass spectrometers . . .

TYPE 21-610 is moderately priced and a truly general-purpose instrument. Although primarily designed for continuous petroleum and petrochemical stream analysis, it is also valuable for production-line leak detection or laboratory analysis. Its applications have ranged from on-the-spot acetylene-plant monitoring to hospital clinical tests on lungs.

TYPE 21-620 has the highest mass range of any instrument in its compact size range. Using the new "Cycloidal Focusing" principle, it goes beyond the 21-610 for accurate readings from mass 2 to mass 150. Medical laboratories, petrochemical plants and general research organizations will all find it ideal for their analytical problems.

Send for Bulletin CEC 1824A-X30.

100,000,000-year-old sniff!



Consolidated Electrodynamics Corporation

formerly Consolidated Engineering Corporation

300 North Sierra Madre Villa, Pasadena, California—SALES AND SERVICE OFFICES IN: Albuquerque, Atlanta, Boston, Buffalo, Chicago, Dallas, Detroit, New York, Pasadena, Philadelphia, San Francisco, Seattle, Washington, D.C.

Electronic Instruments for Measurement and Control

When inquiring check CP 3694 opposite last page

...IN THE AGE OF NUCLEAR AND THERMONUCLEAR DEVELOPMENT

Interested in it? So are we! For here at world-famous Los Alamos Scientific Laboratory, responsible for unleashing the terrifying power of the atom, we are now pioneering in harnessing this power for beneficial uses.

There is exciting adventure in the application of nuclear and thermonuclear energy to weapons, power and propulsion. Supporting these diverse activities here at Los Alamos are many challenging projects in basic physics, chemistry, metallurgy, mathematics and engineering.

Los Alamos needs men and women with imagination and research ability for permanent career positions. Interested? So are we!

Write us for an illustrated brochure describing the Laboratory, its delightful mountain location and its excellent housing and community facilities. Mail your request to

DIRECTOR OF PERSONNEL
DIVISION 502

LOS ALAMOS SCIENTIFIC LABORATORY IS NOW IN ITS 14TH YEAR OF OPERATION.

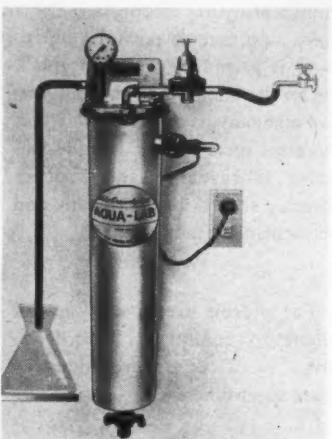
los alamos
scientific laboratory
OF THE UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO

LABORATORY

Lab water-demineralizer has self-indicator of exhaustion

Uses: Providing pure water for small boilers, storage batteries, pharmaceuticals and photo preparations, other laboratory uses.

Features: Demineralizer has self-indicator of exhaustion.



Demineralizer can remain directly connected to water source

Description: Unit uses replaceable cartridge filled with special resins. Cartridge will remove up to 1500 grains in mineral content of tap water, providing many gallons of high-purity water. Demineralizer can remain directly connected to water source even when outlet valve is turned off.

(Aqua-Lab is product of Automatic Steam Products Corp., Dept. CP, 140 W. 31st St., New York, N. Y. . . or for more information check CP 3695 opp. last page.)

Lists temp standards to 1083°C

Five-page bulletin lists temperature standards for calibrating thermometers from 97° to 1083°C. Standards are calibrated to minimum accuracy of 0.1°C.

Re-Si-Porter Vol 1, No. 3 is issued by Weiller Instruments Corp., Dept. CP, 2 Stone Street, New York 4, N.Y. Specify CP 3696 opposite last page.

DIAMOND D BLUE LINE...

jewels

IN THE LABORATORY

- Here is sparkling, crystal-clear laboratory glassware with carefully calibrated blue line graduations, uniform accuracy and precision craftsmanship built in . . . literally, jewels of the glassmaker's art.

- Every piece of DIAMOND D BLUE LINE is double tested to rigid standards and annealed in lehrs in which the temperature is automatically adjusted by electrical controls. The acid resistant blue pigment in the graduations is heat fused into the glassware.

Get the best in laboratory glassware . . . specify DIAMOND D BLUE LINE. Send for new catalog today.

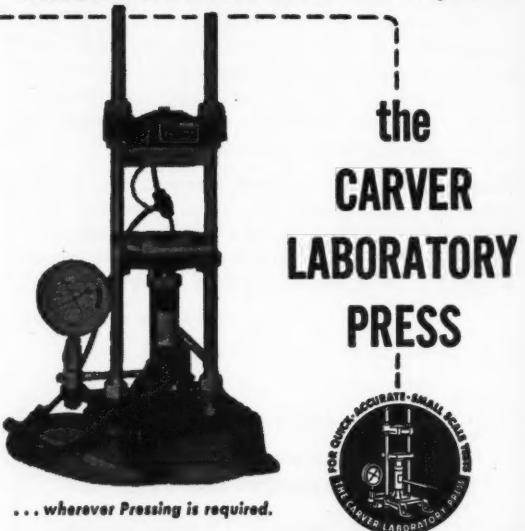
DOERR GLASS COMPANY

VINELAND, N. J.



When inquiring check CP 3697 opposite last page

Standard for Research and Development



... wherever Pressing is required.

Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
52 RIVER ROAD, SUMMIT, N. J.

When inquiring check CP 3698 opposite last page

CHEMICAL PROCESSING

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DO YOU WORK WITH ELECTRONIC EQUIPMENT? you need these two new RCA TUBE BOOKLETS!



RCA Power and Gas Tubes (PG-101B)
—24-page book contains descriptions, terminal connections, technical information on 178 RCA vacuum power tubes, rectifier tubes, thyratrons, ignitrons, magnetrons, and vacuum-gauge tubes. The most up-to-date book of its kind in the industry.

Receiving-Type Tubes for INDUSTRY and Communications (RIT-104)—New, up-to-the-minute technical information on 126 RCA receiving-type tubes especially suited to industrial electronics. Includes technical data, socket connection diagrams, and descriptions on RCA Special Reds, Premium, computer, pencil, and glow-discharge, small thyratrons, low-microphonic, and other tube types.

Write on your company letterhead to RCA, Commercial Engineering, Section B-75-T, Harrison, N. J., for a complimentary copy of RIT-104 and PG-101B.

SEND FOR THESE BOOKLETS TODAY!

RCA **TUBES FOR INDUSTRY**
RADIO CORPORATION OF AMERICA

RCA ELECTRON TUBES... LONG-LASTING,
DEPENDABLE... AVAILABLE THROUGH YOUR
AUTHORIZED RCA TUBE DISTRIBUTOR.

When inquiring check CP 3699
opposite last page

FEBRUARY, 1956

FOR THE LABORATORY

RESERPINE RESEARCH

(Continued from page 137)

furnished an index as to solution strength. Radioactive compound was then added to solvent-extract of *Rauwolfa* containing twenty-one alkaloids besides reserpine.

Carbon-14 was added to gallic acid trimethyl ether portion for additional control of hydrolysis. Since ticklish part of process revolved around non-hydrolysis of the molecule process variables could be studied and determined according to what did destroy the molecule.

Ease of hydrolysis was a further aid in the process development. Reserpine-containing fractions were identified by checking possible hydrolysis with paper chromatography. Immediate indication was given whether process variables were destroying the reserpine molecule.

Main instruments in Squibb's nucleonic approach to reserpine are a proportional-counter converter and a scaler unit. Filtered extract samples are evaporated on glass plates and placed within proportional-counter converter and counting gas is passed through sample. Proportional-counter detects soft betas (0.156 mev) of carbon-14. Total number of radiation disintegrations detected appears on mechanical register. External timer indicates elapsed time, and permits predetermined time operation for checking distribution coefficients.

Results: Squibb institute developed a practical extraction process for reserpine within months without necessity of using conventional bio-assay methods which might have added years to the development. Process yields were determined almost as quickly as changes were made in process variables. Complete test required only examination of extract and original solution. In many cases, result of changing a process variable was known within a half hour.

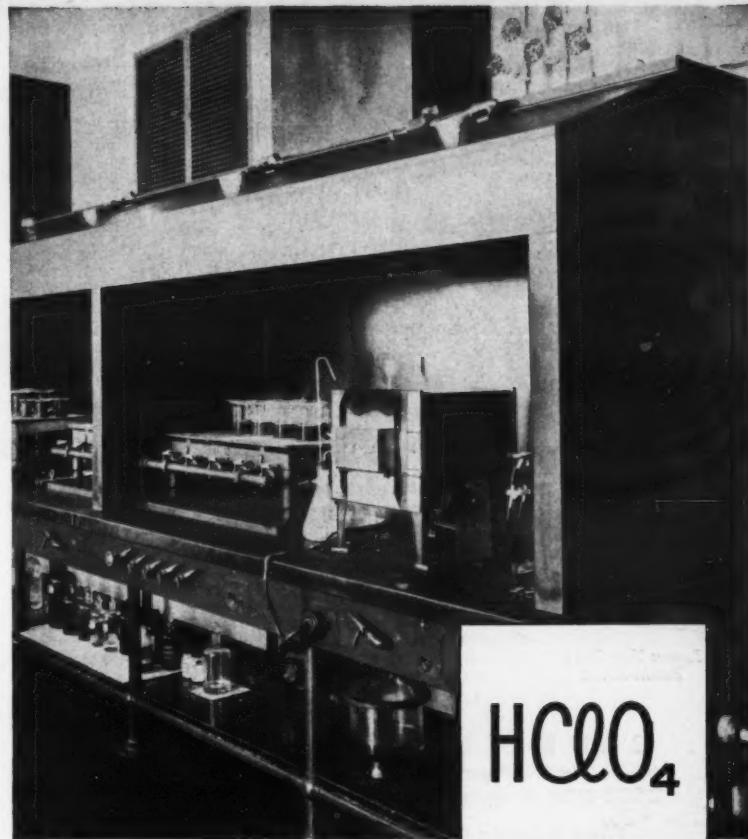
The Institute is building a second laboratory for quality and process control using radioisotopes. Personnel will be Squibb-trained in the present laboratory which will be retained exclusively for research.

(Proportional-counter converter is a product of Nuclear Measurements Corp., Dept. CP, 2460 N. Arlington Ave., Indianapolis 18, Indiana . . . or check CP 3700 on form opposite last page.)

Shows air conditioners for labs

Booklet of 16 pages pictures and describes laboratory apparatus and equipment. Mobile air conditioners, liquid coolers, flexible heating tapes are included.

Digest Number 3 is issued by A. Daigger & Co., Dept. CP, 159 W. Kinzie Ave., Chicago 10, Ill. Specify CP 3701 on form opposite last page.



Let's talk "LOW ABSORBENCY"

For perchloric acid fume hoods.

Alberene Stone has a low absorbency factor of 0.15%. It's essentially nonstaining. Easily cleaned. And readily machined for tongue and groove, watertight construction.

Both of these features are absolutely essential for perchloric hoods — where thorough water flushing and removal is necessary to keep them deposit-free.

Further, with Alberene Stone — the natural silicate stone whose surface goes all the way thru — the all-silicate mineral components resist chemical attack.

Our engineers are ready to help you select or design perchloric hoods or other special-purpose hoods. Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

ALBERENE STONE

provides **LOW ABSORBENCY** protection

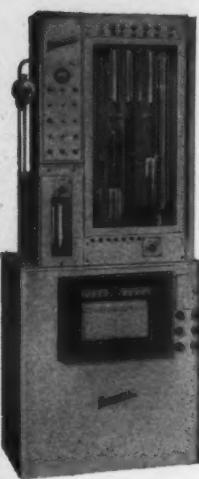
When inquiring check CP 3702 opposite last page

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THE FRACTON®

FOR ANALYSIS OF
LIGHT HYDROCARBONS



Request Your Copy of
Booklet No. 82

For: NATURAL GAS
GASOLINE PLANT GASES AND LIQUIDS
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SYNTHETIC RUBBER INTERMEDIATES
PLASTIC INTERMEDIATES
PETROCHEMICAL GASES
and other light hydrocarbons

THE FRACTON CUTS ANALYSIS TIME AND EXPENSE, IMPROVES ACCURACY AND IS EASIER TO OPERATE

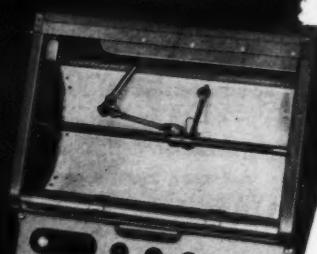
The Fracton separates, identifies, collects and measures the components and records the analytical data in fifty to seventy-five percent less time than former methods. Users get superior accuracy and reproducibility with this new, improved and simplified instrument.

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When inquiring check CP 3703 opposite last page

X-Y PLOTTER AND RECORDER



RECORDS
TWO INDEPENDENT
VARIABLES FROM
ANALOG OR DIGITAL
INPUTS

A compact, desk-size unit designed for general purpose graphic recording from analog or digital inputs with standard Librascope converters or special modifications engineered to customer requirements. Unique pen travel, fast and dependable. Full chart visibility allowing curve generation to be observed at all times. Write for detailed catalog information.

Mechanical and electrical
analog computers, digital
computers, input-output
devices and components.

Computers and Controls

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FOR THE LABORATORY

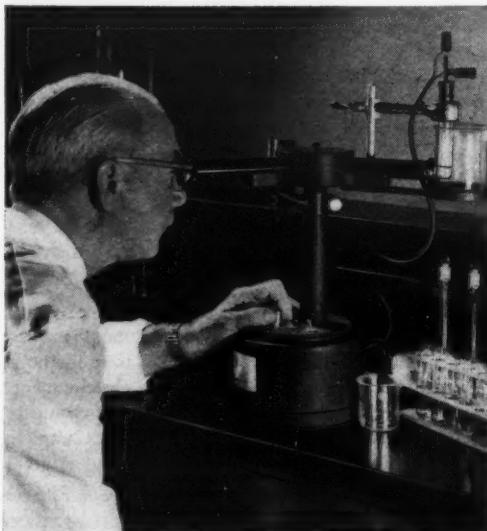
Cuts time on "qual" analyses for rapid identification of 61 elements

Can detect 39 elements in concentrations of
0.05 mg/ml

Uses: Reducing time required for preliminary qualitative analyses.

Features: Spectrum analyzer is relatively inexpensive, easy-to-operate, versatile.

Description: Two platinum electrodes are immersed in 10% solution of nitric acid in which small amount of sample has been dissolved. Appli-



Spectrum analyzer reduces time required for preliminary analyses

cation of a low control voltage produces a fluctuating arc on surface of excitation electrode. Arc lights contain spectra of metallic components in sample. Solid metal samples are analyzed by making them the excitation electrode. Up to 39 elements can be detected in concentrations of 0.05 mg/ml or less of nitric acid. Up to 12 elements can be detected at 0.005 mg/ml.

Instrument is self-contained, operating from standard 115v AC, 60 cps. One model is designed for labs desiring to use their own optical system.

(Todd Spectralan is product of Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. . . . or for more information about manufacturer's product reader may simply check CP 3705 on the convenient Reader Service slip which is located opposite last page.)

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SALES DEVELOPMENT
DEPARTMENT

When inquiring check CP 3706
opposite last page

CHEMICAL PROCESSING

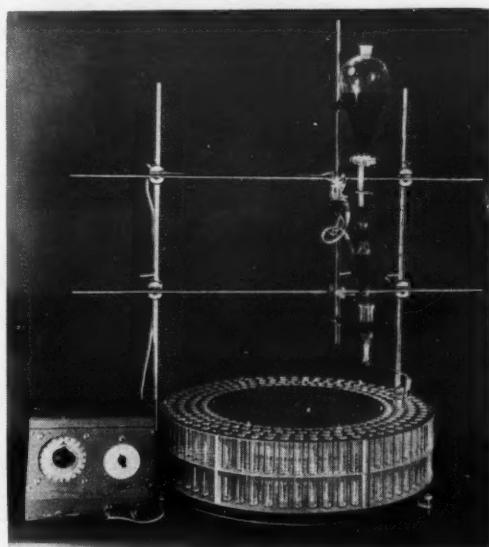
**Collects chromatography samples
on time or volume basis . . .**

volumetric set-up operates without mercury, chemicals or electric current in contact with sample

Uses: Collects fractions from chromatography run on either a timed flow or volumetric basis.

Features: Volumetric collection brings no mercury, chemicals, or electric current into contact with sample.

Description: Design of collector is such that either culture or lipped tubes may be used for collection. Support is furnished at bottom of the



Fraction collector is shown in typical setup

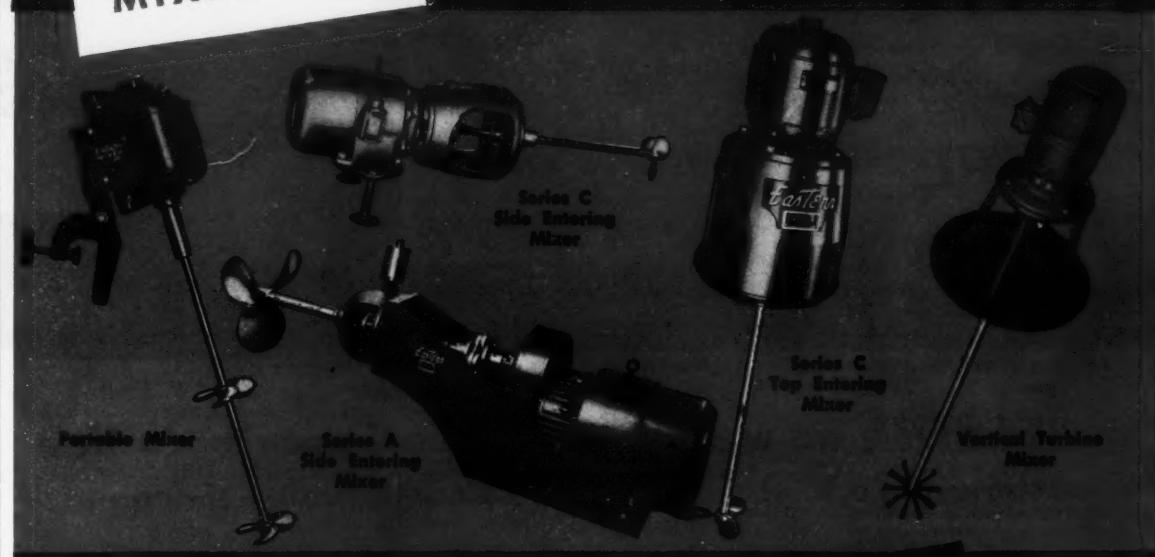
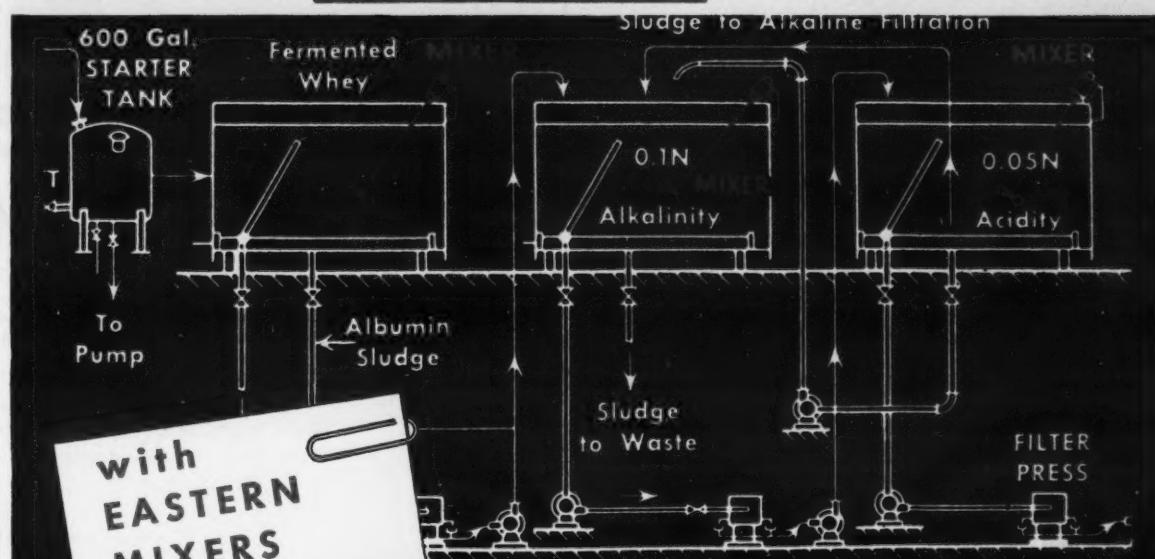
tube. Collector is equipped with three interchangeable receiver tables or an adaptor for large volumes. Tables are equipped with three mounting holes to accommodate indexer which is used interchangeably.

When used for timed-flow collection, electronic timer controller indexes each tube to receive fractions for an interval ranging from 18 seconds to two hours.

For volumetric operation, movement of table is triggered by collection of liquid in a reservoir. As material rises in reservoir's siphon, potassium bicarbonate solution rises in a manometer to contact electrodes. When circuit is made, indexer moves collecting table placing next tube under delivery spout of siphon. As level continues to rise, intermittent siphon reaches its discharge level, material is delivered to tube placed under delivery tip.

(Fraction collector is available from Schaar & Co., Dept. CP, 754 W. Lexington St., Chicago 7, Ill. . . or for more information check CP 3707 on form opposite last page.)

RELIABLE FLUID MIXING in PROCESSING



Eastern's Mixers are designed to meet the needs of today's chemical and industrial processes. Many types are available to satisfy all conditions of fluid consistencies and tank sizes. Selection may be made from a wide range of horsepower, speed, and construction materials. Motors with various voltage ratings and enclosures are also furnished.

PORTABLE MIXERS

Series H at 1725 R.P.M., Series S at 1125 R.P.M., and Series G at 420 R.P.M. are available in motor ratings from 1/20 to 5 H.P. Also available are special speeds, variable speeds, as well as air driven models.

TOP AND SIDE ENTERING

Series A, extra heavy duty for large tanks, are available in side entering units

only within a range of 5-30 H.P. with standard speeds of 280, 420, and 1150 R.P.M.

Series C, for average tank capacities, are available in sizes of 1/4 to 10 H.P. at these standard speeds: 1725 R.P.M. (up to 5 H.P.); 1140 R.P.M. (up to 10 H.P.); 420 R.P.M. (up to 7 1/2 H.P.); 280 R.P.M. (up to 5 H.P.). Available in both horizontal and vertical models.

TURBINE MIXERS

Eastern's Top and Bottom Entering Turbine Mixers find particular application where liquid blending requires gentle, yet thorough agitation.

Models are available in sizes from 1/4 to 40 H.P. Standard speeds are 56, 68, 84, 100, 125, 155 R.P.M.



For 3 bulletins covering Eastern Mixers, request Catalog Series 27.



When inquiring check CP 3708 opposite last page

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Let Colton Chemists
Show You How to

PUSH YOUR
PRODUCT

WITH
VINOL
(POLYVINYL ALCOHOL)

Adhesive formulations, Textile sizes and Paper coatings are greatly improved with VINOL Polyvinyl Alcohol. The result is a better product enjoying a greater share of sales and profits.

Colton chemists will be happy to show you how to use white, fast-dissolving, free-flowing, non-gelling VINOL Polyvinyl Alcohol to the best advantage... without obligation. Colton's bigger productive capacity means dependable delivery... with assured quality from batch to batch and month to month.

For samples and information,
address Dept. C2

SPECIFICATIONS

VINOL Polyvinyl Alcohols now available in the following grades:

PA-5, PA-20 (88% hydrolyzed)
Low and medium viscosity partially-acetylated grades.

FH-100, FH-400, FH-500, FH-600
(99% hydrolyzed)

Low, medium, medium high and high viscosity fully-hydrolyzed grades.

COLTON CHEMICAL COMPANY



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Products of other divisions of Air Reduction Co., Inc. include: AIRCO—industrial gases, welding and cutting equipment • PURECO—carbon dioxide, liquid-solid ("DRY-ICE") • OHIO—medical gases and hospital equipment • NATIONAL CARBIDE—pipeline acetylene and calcium carbide.

When inquiring check CP 3709
opposite last page

FOR THE LABORATORY

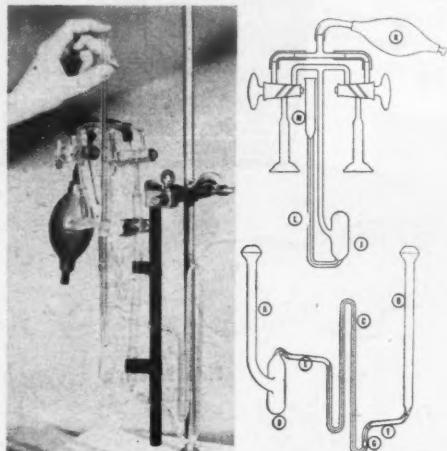
Gives polymer molecular weight using only 1 ml of solution . . .

viscometer allows dilutions and reruns — eliminates errors caused by evaporation

Uses: Determining molecular weight in polymer work when only a small amount of solution, about one ml, is available.

Features: Viscometer eliminates errors caused by evaporation of solvent.

Description: Viscometer is designed to allow dilution of solution in instrument by direct addi-



Picture indicates method of use. Diagram shows parts. Reservoir B receives sample. Head between A and D forces liquid through C. Assembly K-M eliminates evaporation losses

tion of solvent. Viscosity is measured by time required for quantity of solution to flow through triple-bend capillary. Instrument consists of two arms—vertical glass tubes about six inches long—connected by capillary. Reservoir on one arm receives sample. Hydrostatic head between two arms forces liquid through capillary. Fiducial marks on triple-bend capillary are used to time flow. Rubber suction bulb and glass-valve assembly is mounted on two arms of instrument to eliminate evaporation losses from volatile solutions.

Flow time of 100 sec or more eliminates corrections for kinetic energy. Effects of shear rate are negligible in intrinsic viscosity determinations. Instrument was developed specifically for one ml quantities but design can be adapted for larger or smaller volumes.

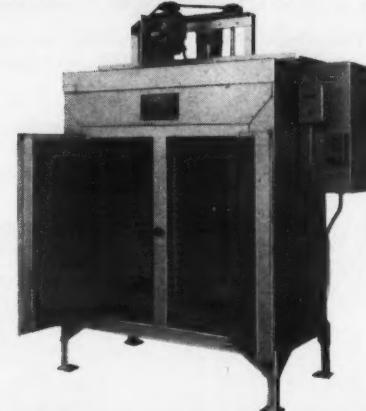
(Information was taken from Summary Technical Report by National Bureau of Standards, U.S. Dept. of Commerce. For further details see V.E. HART, "A Semimicro Dilution Viscometer", *J of Polymer Sci*, Vol 17, p207, 1955.)

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Controlled Conditions

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- Conveyor types—belt, carrier, etc.
- Heating—electric, gas, steam or oil, with positive air recirculation.
- Accurately controlled processing temperature.
- Rugged, insulated steel or stainless steel panel construction.

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When inquiring check CP 3710 opposite last page

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USE

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Hermetically sealed against moisture and dirt to bring you years of trouble free service.



Designed to be used indoors or out, the stainless steel case is impervious to most corrosive agents.



Recalibrate the dial externally by inserting the stem in liquid of known temperature and adjusting screw attachment.



Rochester Straight-Form Thermometers bring you the added advantage of a stem that can be mounted in any position around the dial.

For additional information contact your Rochester sales engineer or write:

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Manufacturing Company, Inc.
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When inquiring check CP 3711 opposite last page

CHEMICAL PROCESSING

Hand
using

Uses
or i
valve
from
ther
mera
tube

Feat
mod
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FEB

FOR THE LABORATORY

Handles high loads, is stable using minute DC signal

Uses: High wattage loads such as incandescent or infrared heaters, refrigerating units, solenoid valves, and motor-driven devices can be controlled from low-current sensing elements like bi-metal thermostats, pressure-operated switches, or even mercury column thermal regulators or gas phototubes.

Features: Switching arrangement allows four modes of operation — normally open load with normally open or closed signal switch, normally closed load with normally open or closed signal switch. Operation is fail-safe in any mode.

Description: Stable DC circuit of relay employs one dual triode which is parallel connected. This is an industrial tube with a 10,000 hour service rating.

Design of relay is such that shock hazard is eliminated for water bath and similar operations. Input terminals in case are completely isolated from AC



Four-mode control switch is clearly seen in this picture of relay

line. Heavy 3-wire line cord incorporates a separate ground lead.

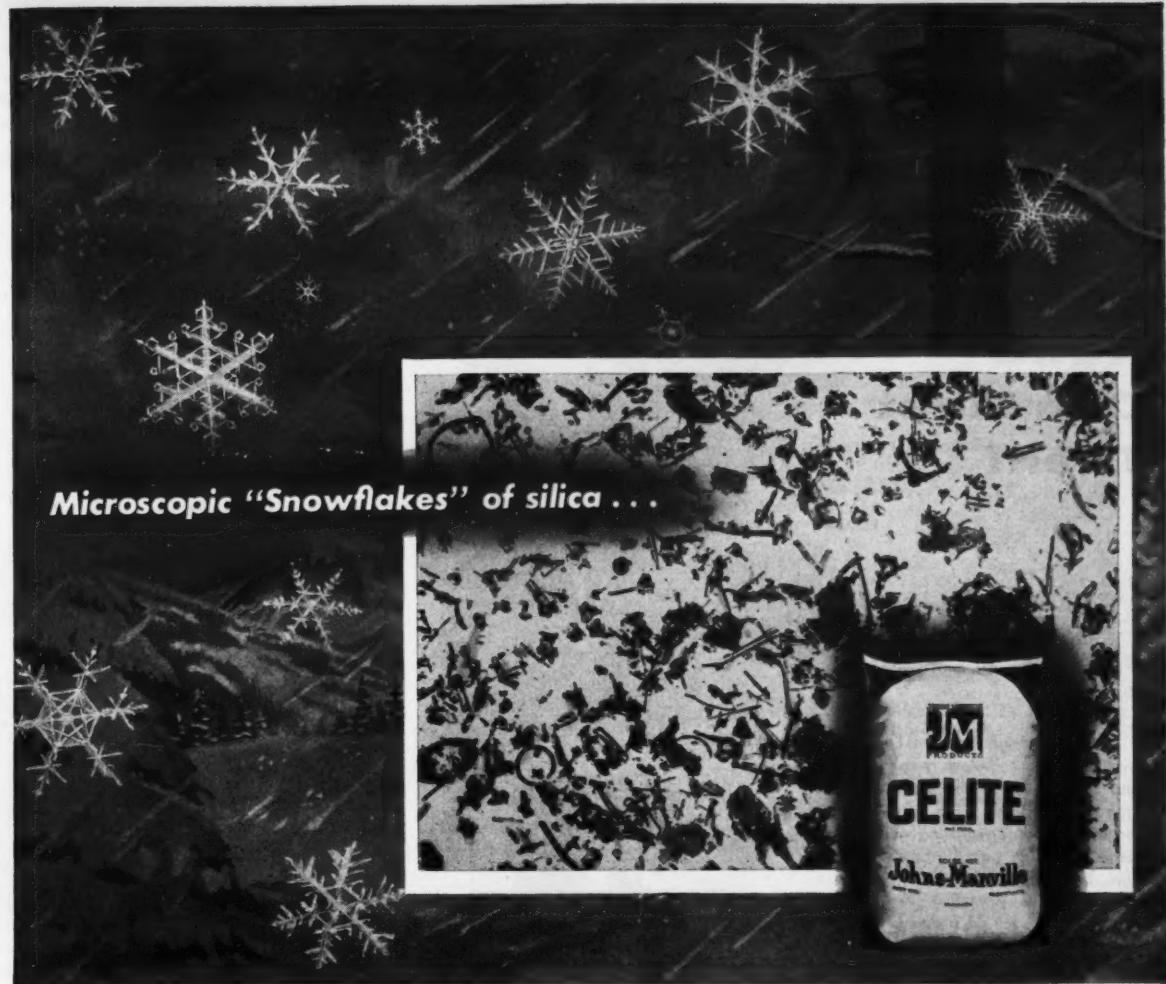
Capacity of the relay is 20 amps at 120v AC.

(Sensitive electronic relay is a product of Arthur S. La Pine & Co., Dept. CP, 6001 S. Knox Ave., Chicago 29, Ill. Check CP 3712 opposite last page.)

Describes fast assay of mill products

One-page data sheet suggests colorimetric method of analysis for tungsten, molybdenum, phosphorus, and manganese, using spectrophotometer.

Data Sheet DU-39-M is issued by Beckman Div., Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. Specify CP 3713 on form opp. last page.



Celite's diatomite structure steps up performance in paints—plastics—polishes... hundreds of other products

MICROSCOPIC PARTICLES of Celite* do a man-size job of stepping up performance for many of America's leading products. Here is how the unique structure of Celite Diatomite Powders may add more beauty, longer life, greater efficiency to *your* products, too.

For example, the spiny, irregularly shaped particles contribute surface characteristics which make them the outstanding flattening agent in paints. Again, because of their structure, Celite particles are widely used as a

mild, non-scratching abrasive in finest quality auto, silver and glass polishes. Or consider molded plastics, where the strength and durability of Celite particles add life and beauty to surface finish.

Moreover, Celite particles in mass have great bulk per unit weight, so they are invaluable for extending, dispersing or fluffing up dry powders. They have high absorptive capacity, too, so they keep powders free-flowing, they serve as a medium for shipping

or storing liquids in a dry form.

Which of the many Celite advantages can you use to build product performance or cut production costs? A Johns-Manville Celite Engineer will gladly discuss your problem, without obligation. For his services or more information, simply write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

*Celite is Johns-Manville's registered Trade Mark for its diatomaceous silica products.

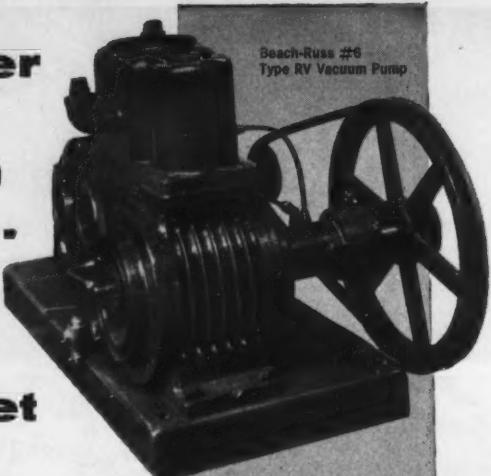


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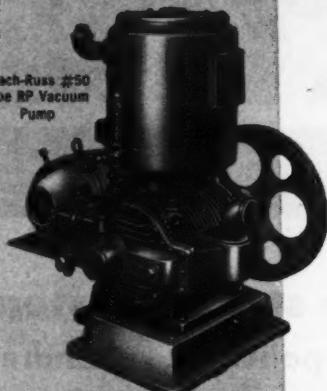
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Your
Vacuum
Needs...
BEACH-
RUSS
Can Meet
Them**



Beach-Russ Model O
Portable Vacuum Pump



Beach-Russ #50
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Pump



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Beach-Russ High Vacuum Pumps are available in a complete range of types and sizes to meet any vacuum need. From the smallest 1 c.f.m. portable unit for testing and dehydrating work, to the large 1800 c.f.m. units for process operations, these precision-built

**BEACH-RUSS
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Fast "Pump-Down"
High Efficiencies
Quiet, Vibrationless Operation
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If you are planning a new installation or are in need of technical advice, get in touch with Beach-Russ.

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We are interested in Beach-Russ Vacuum Pumps for

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When inquiring check CP 3715 opposite last page

LABORATORY

**Brings proportional,
reset control action
to lab baths**

Uses: Laboratory control of constant-temperature baths, controlled heating, air baths, etc.

Features: Sensitive controller can be used for three modes of control — on-off, proportional, and proportional with reset.

Description: Electronic circuit of temperature controller employs two 12AX7 tubes and a thyratron. AC wheatstone bridge is used. Designed for use with resistance temperature bulbs having time con-



Temperature control range is
-70 to 200°C

stants of less than 1 second, controller is currently available for use in the -70 to 200°C (-94 to 390°F range. When used with air baths, upper temperature limit is extended to 300°C (570°F).

Controller is supplied in single range to match bulb used. Control mode may be selected by switches on instrument's panel. Switching arrangement changes it from on-off to proportional to proportional with reset action.

As a straight proportional controller, proportional range is adjustable in nine finite steps from 0 to 100% proportional band. When reset action is applied, proportional band temperature differential is reduced by a factor of 100. Reset rates are adjustable in eight steps from 6 to 90 seconds.

Controller will handle a load of 3000 watts in heating elements.

(Thermotrol is a development of Hallikainen Instruments, Dept. CP, 1341 Seventh St., Berkeley, Calif. Check CP 3716 opp. last page.)

**For laboratory
investigations,
analytical tests or
production control
requiring heat testing**

**specify a
DESPATCH**

LABORATORY OVEN

**Here is the practical solution
for laboratories, manufacturers
and chemical producers who
operate with close temperature
requirements.**

Despatch has more than 52 years' experience in designing and producing laboratory ovens, and has placed emphasis where it belongs—on rugged construction and temperature uniformity—constant heat with even distribution—the ability of its ovens to perform accurately at peak temperatures for extended periods of time. Nine basic models provide oven capacities from 1 to 60 cubic feet.

For complete data on Despatch Laboratory Ovens, write for Bulletin #100 stating product to be processed, time and temperature cycle and size of oven required.

DESPATCH

DESPATCH OVEN COMPANY
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When inquiring check CP 3717 opposite last page

**LIGHT
BUT SO STRONG!**

**TOTELINE
FIBERGLASS
TRAYS**

**For Drying:
CHEMICALS
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ANTIBIOTICS**



TOTELINE
Wherever
materials
are handled

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write



MOLDED FIBERGLASS TRAY CO.

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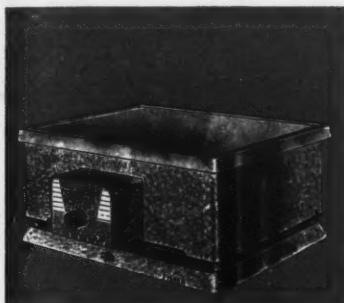
LINESVILLE, PENNSYLVANIA

When inquiring check CP 3718 opposite last page

Faster, easier, better



at the Turn of a Dial



Dimensions: 8½" h., 18½" w., 14½" d

FISHER OSCILLATING HOT PLATE

The Fisher Oscillating Hot Plate assures rapid and complete mixing, dissolving, precipitation or evaporation without spattering at a constant 216 rpm, with or without heat. 2000 watt cast-in-aluminum heating element, operating at 200° F to 700° F surface temperatures, gives faster, more uniform heat distribution. Stepless control allows operator to dial and duplicate the exact heat every time, all the time, for maximum effectiveness with minimum attention. Heater and oscillator operate independently or together.

Send for details

The new Fisher Catalog Supplement, page 53, gives specifications on the Fisher Oscillating Hot Plate. Send for your copy.

WRITE: 103 Fisher Bldg., Pittsburgh 19, Pa.

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B-1-A

When inquiring check CP 3719
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FOR THE LABORATORY

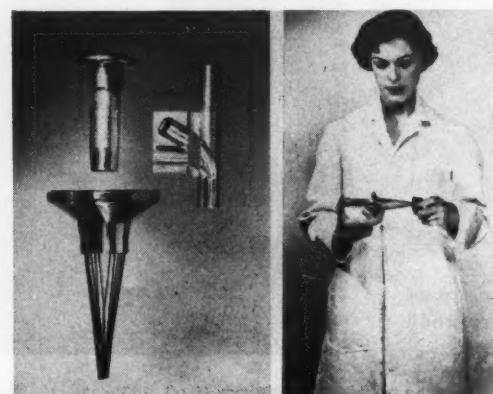
Reduces "breakage" danger — Inserting glass tubing in rubber stoppers . . .

will sleeve most laboratory tubing, either straight or angle, including T-tubes, L-tubes, Y-tubes

Uses: As safety device for inserting glass tubes in rubber stoppers, rubber tubing and bulbs.

Features: Unit will sleeve most laboratory tubing, either straight or angle, including T-tubes, L-tubes, Y-tubes.

Description: Device has three basic parts, plunger, adapter key and inserter which has flexible steel fingers for guiding the glass tube. Inserter fingers are placed in the stopper opening.



Three parts of inserter are shown at left. Method of insertion is shown at right

Glass tubing is slipped into the inserter and the plunger is placed over the top of glass tube. Steady pressure on the plunger pushes the tubing into position. A slight twisting motion frees inserter from rubber stopper.

Device is constructed entirely of die-cast aluminum with exception of flexible fingers. Unit is adaptable to angle tubing of 1.4 to 9 mm in diameter and up to 13 mm, or more, for straight tubing.

("Tube-On" is product of Central Scientific Company, Dept. CP, 1700 Irving Park Road, Chicago, Illinois . . . check CP 3720 opposite last page.)

Illustrates lab sinks of porcelain

Bulletin in three colors of 20 pages illustrates complete line of chemical porcelain laboratory sinks. Bulletin describes how laboratory sinks are made.

Bul L-8 is issued by The U. S. Stoneware Company, Dept. CP, 60 E. 42nd Street, New York 17, N.Y. Check CP 3721 opposite last page.

DENVER PROCESS EQUIPMENT

DENVER (patented) SUPER AGITATORS and MIXERS	SIZES 3' x 3' to 20' x 20'	Patented standpipe around propeller shaft assures positive agitation and circulation. Patented wearing plate prevents sand-up on shut-down. Heavy duty as well as acid-proof construction is available in both open-type, air lift and Super Agitator models. Please write for Bulletin No. A2-B4.
DENVER Steel-Head BALL MILL	3' x 2' to 6' x 12'	A Denver Steel-Head Ball Mill will suit your particular need. Five types of discharge trunnions. All-steel construction. Low initial cost due to quantity production. Quick delivery. Laboratory and pilot plant mills also available. Please write for Bulletin No. B2-B3.
DENVER CLASSIFIERS	18" to 60" Wide Suitable Length	Denver Rake Type Classifiers are available in sizes from 1' 6" x 14' 8" to 8' x 21' 8". Denver Spiral Classifiers range in size from 6' x 5' 8" to 60' x 33' 4". Denver Hydro Classifiers are available in diameters from 6' to 55'. All are designed to efficiently separate fine particles in specific applications. Please write for bulletin No. C5C-B.
DENVER Forced-Feed JAW CRUSHER	2 1/4" x 3 1/2" to 32" x 40"	Cast Steel Frame, manganese jaw and cheek plates. Large diameter shafts reduce shaft deflection and thus increase life of heavy-duty, oversize roller bearings in bumper. Setting easily controlled. Please write for Bulletin No. C12-B12.
DENVER Wet Reagent FEEDER	0 cc to 2000 cc	Accurately meters minute quantities of liquid from 0 cc to 2000 cc per minute. Float valve in tank permits connection of feeder to bulk storage device. Handwheel adjustment to control amount of liquid is simple and accurate. Used in multiples for higher capacities. Please write for Bulletin No. F6-B9.
DENVER Disc FILTER	1 Disc, 2' to 8 Disc, 6'	Special, patented design of segments in Denver Disc Filters use both gravity and vacuum to give a drier filter cake. Draining is complete and positive, with no blow-back. Simple, low-cost, dependable construction. Quick delivery. Also Drum and Pan Filters. Please write for Bulletin No. F9-B2.
DENVER "Sub-A" FLOTATION	Laboratory and Commercial	Flotation is the selective separation of particles from each other in a liquid pulp by means of air bubbles. More large plants are installing Denver "Sub-A's" for their entire flotation job, because they give maximum recovery at a low cost per ton. Dependable, low-cost, simplified continuous operation. Please write for Bulletin No. F10-B3.
DENVER Withey Concentration TABLES	5 to 150 T/24 Hrs.	A mechanically operated, longitudinally reciprocating table consisting of a deck having a plane surface partly rifled and a tilting device. It separates materials into bands and handles the coarsest sands with excellent results. Ideal for separation of groups of particles having a similar range of specific gravities. Write for Bulletin No. T1-B3.
DENVER LABORATORY EQUIPMENT	Batch or Continuous	Batch and continuous test models of Crushers, Screens, Ball Mills, Pulverizers, Rod Mills, Classifiers, Agitators and Mixers, Pulp Distributors, Feeders, Flotation Machines, Pumps, Thickeners, Filters, Dryers, Tables, Samplers. Results obtained on Denver Laboratory Equipment can be duplicated by commercial machines. Please write for Bulletin No. LG3-B10.
DENVER Standard DRYERS	2' x 13' to 5' x 40' and larger	Available in several types: Direct Heat, Indirect Heat, and Steam Tube. Let DECO Engineers solve your drying problem. No dryer problem too small or too large. Please write for Bulletin No. D4-B2.

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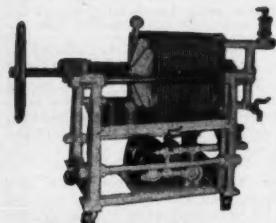
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**ERTEL EQUIPMENT SERVES
The CHEMICAL PROCESSING Industry**



**ERTEL
MODEL
EFS
FILTER**

Designed for use with any type filtering medium. Uses 10 to 40 filtering surfaces 12" x 12" square. Filter media creates its own gasket, thus rubber washers are eliminated. Nickel plated bronze or all stainless steel circulatory passages.



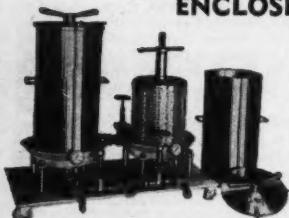
**EU MODEL
UTILITY
FILTER**

Comparison and operation records prove this 16" square filter unmatched in performance. Fully described in catalog. Ask for your copy.

ERTEL ASBESTOS FILTER SHEETS

Available in ten uniform grades for all filters up to 25" square. Manufactured under rigid control, they are acid treated to meet Ertel standards of low leachable calcium and iron content. As a double check, these pads are analyzed periodically by an independent laboratory . . . reports of these tests are available at any time. A complimentary set-up of these pads for your present filter is available upon request.

**ECD MODEL
ENCLOSED DISC FILTER**



Incorporates the outstanding feature of independent closing of filtering elements thus providing a positive seal. A unit built by engineers for trouble-free operation. Twin cylinder unit illustrated—also available with single cylinder for smaller capacities.

**ERTEL ENGINEERING
CORPORATION**

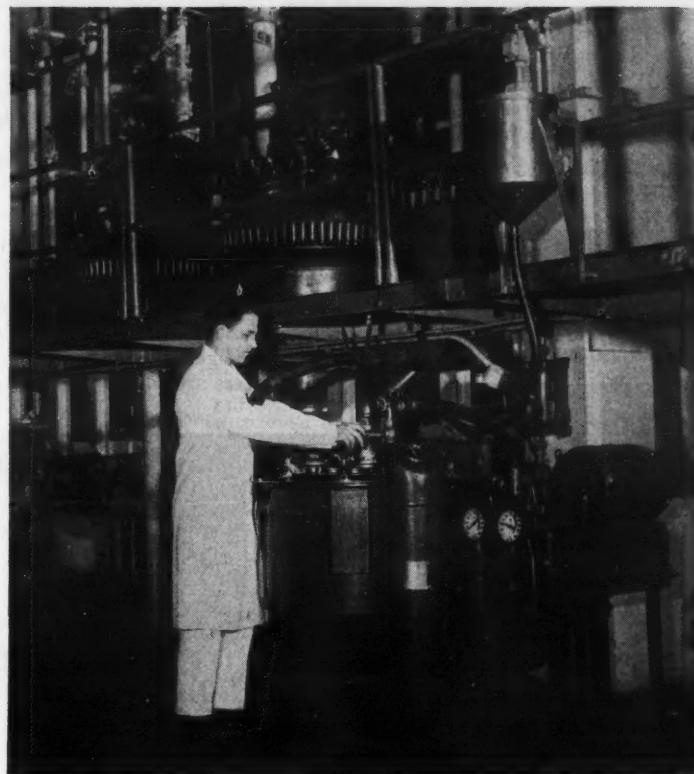
KINGSTON 3,
Branch Office & Showroom Located in New York City

OUR REPRESENTATIVES
THOMAS BAUER
COMPLETE LINE OF
Liquid Handling Equipment



When inquiring check CP 3723 opposite last page

**processing
equipment**



CP Staff Photo
Centrifuge serves glass-lined and stainless steel reaction vessels seen in background

*allow optimum speed
for crystal separation*

**Combination assures thorough washing
and high product purity**

By THEODORE W. WETT, Assistant Editor

Problem: Separation of pilot plant products, with widely varying crystal structures and packing characteristics, from reaction solutions was required in Abbott Laboratories' Development Department, North Chicago, Ill. Products from three pilot-plant reaction vessels included organics and antibiotics, and involved various forms of crystal isolation from numerous corrosive and flammable solvents. Processed in glass-lined and stainless steel reactors, products

had to be isolated efficiently, while maintaining a high degree of purity.

Solution: In mid-1952 Abbott installed a 26", center-slung, 316 stainless steel centrifuge powered by an infinitely-variable-speed hydraulic drive. Centrifuge has fume-tight cover, for exhaust of hazardous solvent fumes, fitted with sight glass, feed pipe, spray nozzle, and vent pipe. Basket is perforated and uses a backing screen 8 x 8 mesh of 316-stainless with retaining rings. All electrical equipment is explosion-proof. Tachometer indicates basket rpm.



CP Staff Photo
Infinitely-variable-speed hydraulic unit which drives centrifuge

Hydraulic drive is 3 hp and consists of a variable-delivery pump and constant-displacement motor. Speed of basket is governed by volume of oil delivered to hydraulic motor by pump. It is continuously variable from zero to 1200 rpm (rated rpm for centrifuge) with full control of accelerating and decelerating speed. Regenerative braking is automatic.

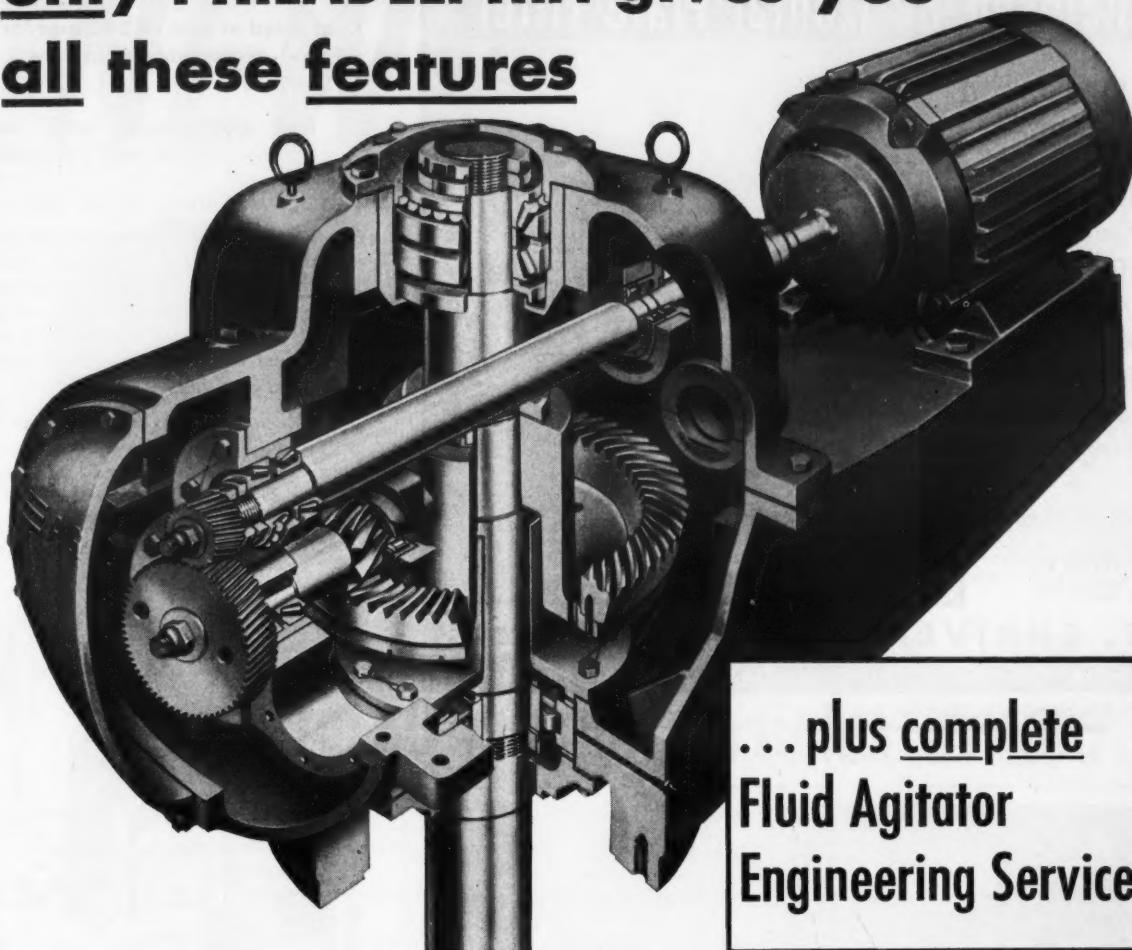
Results: Drive allows a centrifuge speed that will give optimum separation for particular crystal structure of product in process. Unlimited variation of speed allows easy loading, efficient washing and spinning, and quick unloading. Hydraulic coupling prevents transmission of shock from load to drive motor. Stainless steel construction of centrifuge assures product purity and permits use of a wide range of solvents.

(Model 1B1 centrifuge is a product of Tolhurst Centrifugals Div., American Machine and Metals, Inc., Dept. CP, East Moline, Ill. . . . or for more information check CP 3724 on form which is located opposite last page.)

(Hydraulic drive for centrifuge was supplied by Oilgear Co., Dept. CP, 1560 West Pierce St., Milwaukee 4, Wis. . . . or for more information check CP 3725 on form opposite last page.)

Viscosities of acrylic monomers can be determined rapidly with nomograph on page 212

only PHILADELPHIA gives you all these features



... plus complete
**Fluid Agitator
Engineering Service**

Now, for the first time one manufacturer is able to offer a completely integrated, "packaged" fluid agitator service. No other manufacturer controls, within its own organization, such extensive and specialized designing, engineering, manufacturing, assembling, testing, and field servicing facilities devoted exclusively to fluid agitator production. Philadelphia Gear Works manufactures impellers, shafts, drive supports, all gears, and reducer housings. Only Phillie Gear can offer you the complete solution of your fluid agitator problems —through one centrally-controlled, thoroughly responsible source.

Our engineers are familiar with the requirements of all types of process mixing and fluid agitation applications.

Philadelphia Gear Works products have "measured up" through 63 years of industrial leadership. Compare the new Philadelphia Fluid Agitators for economy, efficiency and quality. See for yourself why Philadelphia Fluid Agitators are your very best investment.

COMPARE THESE FEATURES: Exclusive Philadelphia Low Head Room Design—maximum bearing span with minimum headroom • Helical Change Gear Set, within housing, allows for ready selection of up to 14 different standard speeds • Heavy Duty Thrust Bearings permit use of standard units for conditions of high pressure in closed tanks • Large Heavy Duty Output Shafting results in less shaft deflection at stuffing box or mechanical seal, steady operation of long overhung agitator shafts • Philadelphia Heavy Duty Inboard Bearing Support provides extra rigidity resulting in superior gear performance and life • Spiral Bevel Gears of Hardened Steel, accurately lapped for long and quiet operation • Field-proven Philadelphia Dry-Well Construction prevents oil leakage down output shaft • Labyrinth-type seal on input shaft allows effective sealing with minimum friction • Ask for Bulletin A2-55.



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NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
BALTIMORE • CLEVELAND
Virginia Gear & Machine Corp. • Lynchburg, Va.



Industrial Gears & Speed Reducers

Limitorque Valve Controls

Established 1882

When inquiring check CP 3726 opposite last page

Enclosed Horizontal Plate Filter

- Leakproof
- Vaporproof
- for Batch or Continuous Operation
- Cake stays in place even when run is interrupted
- Easy to clean

Write for Catalog

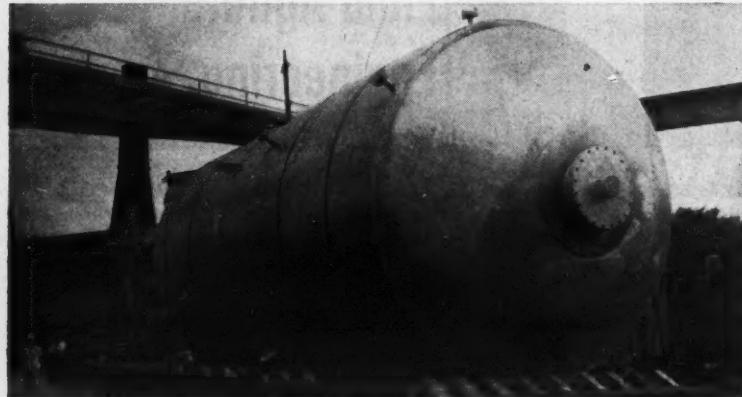
T. SHRIVER & COMPANY, Inc.

Filter Presses • Filter Media • Diaphragm Pumps

846 Hamilton St., Harrison, N.J.

Sales Representatives in
Decatur, Ga.—Houston, Tex.—St. Louis, Mo.
San Francisco—Montreal—Toronto

When inquiring check CP 3727 opposite last page



COLE ALUMINUM TANKS

**R. D.
COLE**

Manufacturing Co., Newnan, Ga.

When inquiring check CP 3728 opposite last page

- TANKS
- TOWERS
- CYLINDERS
- VESSELS
- STANDPIPES

• We invite your inquiries for high pressure storage tanks, elevated tanks, acid or oil storage tanks, bins, boilers, stacks, etc.

PROCESSING EQUIPMENT

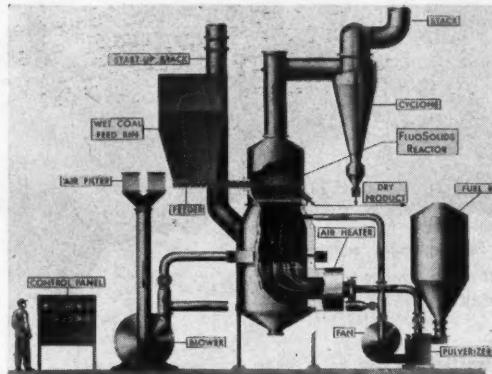
Coal dried at rate of 200 tons/hr
without measurable oxidation
in fluidized system . . .

rapid heat transfer, instant vaporization of moisture result in high drying efficiencies

Uses: Heat-drying of fine coal.

Features: System can handle up to 200 tons coal an hour without any measurable oxidation of the product. Moisture content of final product may be controlled at any desired level — 2-3% being the normal content. Rapid heat transfer and almost instantaneous vaporization of free moisture result in high drying efficiencies.

Description: Primary component of the FluoSolids coal drying system is a two-compartment reactor. In the lower non-fluidized combustion chamber, pulverized coal is burned to produce the necessary heat for drying. Located directly above is the fluidized drying compartment, separated from the com-



Fluidized system for drying coal has successfully dried material as coarse as 1½" x 0

bustion chamber by a specially designed constrictive plate. Wet coal is introduced into the fluid bed by a screw conveyor. Coarse, dried product is discharged just below fluid bed level, and fine, dried material (entrained in exit gases) is collected in a cyclone.

Coal to be used as fuel is ground in a pulverizer and blown by a mixture of fresh air and recycled hot gases into the air heater, where it is ignited. After combustion in the lower section of the bottom compartment, tempering air is introduced through a bustle pipe around the chamber. Resulting mixture of hot gases rises into drying compartment, fluidizing the bed of coal and holding particles in suspension. Incoming feed is brought up to temperature immediately and the moisture evaporated. Dried products may be either segregated or recombined. Recommended operating temperature is in range of 150 to 160°F. Temperature may be varied, however, according to requirements of specific application.

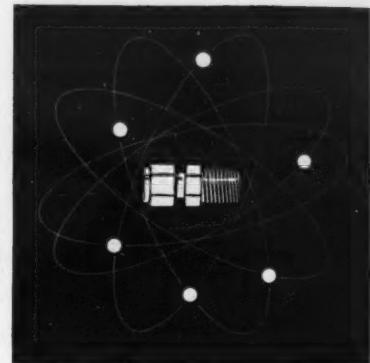
NOW **Swagelok®**
TUBE FITTINGS FROM

ALUMINUM

Brass	Monel	Steel
Carpenter 20	Nickel	Tantalum
Gold	Platinum	Teflon
Hastelloy	Silver	Titanium
Inconel	Stainless Steel	Zirconium

ZYTEL*

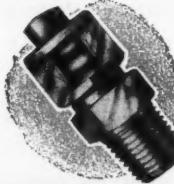
POLYAMIDE RESIN



From aluminum to "Zytel" there's a Swagelok answer to your fitting problems. The new Swagelok Tube Fittings of "Zytel" are for use with plastic tubing in applications where corrosion is a problem. They are the first to be made in a complete range of shapes that include elbows, tees, reducers and adaptors.

The new Swagelok Tube Fittings of "Zytel" are made to the unique Swagelok patented design that provides strong, torque-free and leakproof joints at all tubing connections. Sleeves or inserts are unnecessary. Specify Swagelok for every fitting need and eliminate unnecessary fitting problems.

FREE: For complete information write for the Swagelok catalog. Address Dept. C41



Swagelok Tube Fittings Are
Easy to Use
No Special Tools Needed
No Flaring or Threading

*DuPont trade-mark

CRAWFORD FITTING CO.

884 E. 140th Street
Cleveland 10, Ohio

When inquiring check CP 3729
opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

Temperature is controlled by varying either wet-coal feed rate or fuel consumption. System may be modified to use fuels other than coal. Absence of moving parts in contact with high temperatures keeps maintenance to minimum. Control by instrumentation minimizes operating attention and assures uniform results.

Originally developed to dry $\frac{1}{4}$ " x 0 coal, system has successfully dried material as coarse as $1\frac{1}{2}$ " x 0 with equal efficiency.

(Dorrco FluoSolids System for fine coal drying is product of Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. . . or for more information check CP 3729A on form opposite last page.)

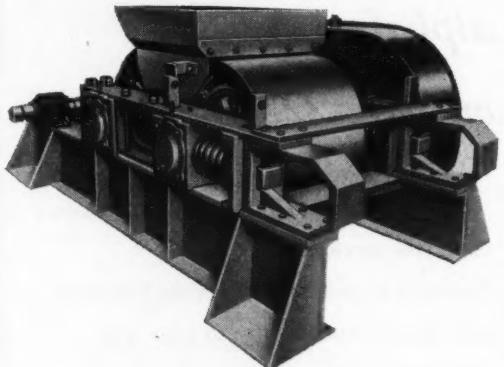
**Up to 254 tons per hour
handled by twin-roll
crusher . . .**

power requirements range from 85 to 105 hp

Uses: Crushing rock, ore, minerals, or other aggregates.

Features: Capacity of crusher runs up to 254 tons of $-2\frac{1}{4}$ " aggregate per hour, based on material weighing 2700 lb per cu yd.

Description: Overall dimensions of unit are 8'6" long by 6'10" wide by 5'3 $\frac{1}{2}$ " high. Weight of unit, 11,200 lb; power requirement 85-105 hp. Crusher has two 30" diam by 24" wide rolls. Maximum feed size is $4\frac{1}{2}$ " x $4\frac{1}{2}$ ", using low corrugated rolls.



Crusher has two 30" diam by 24" wide rolls

Unit is new addition to manufacturer's line of crushers. Design has been modified to include hydraulic jack and shim-adjustment mechanism, which simplifies changing roll setting for varying size of crushed product.

(Twin-roll crusher is product of Pioneer Engineering Works, Inc., Dept. CP, 1515 Central Avenue, Minneapolis 13, Minnesota . . . or for more information check CP 3729B on form opp. last page.)

NEW!



Porous stainless steel (15-diameter magnification)

**Cuno Poro-Klean filter
stops 3-to 30-micron particles at 900°F**

Cuno's new Poro-Klean offers true micronic filtration at temperatures that melt tin, bismuth, cadmium, lead or zinc.

High temperatures, high viscosity, high pressure drops and corrosive fluids don't faze this new filter.

It's all metal—absolutely lint-free. There's no contamination of the filtered fluid.

It's strong. Poro-Klean filters already in operation take a pressure drop of 1500 psi. Poro-Klean porous stainless steel has been used for structural parts in aircraft to achieve boundary layer control and transpiration cooling.

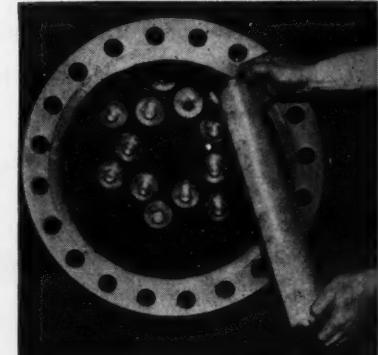
It's corrosion resistant. Standard in 316 stainless steel. Low carbon content (0.03 to 0.05% max.) prevents carbon precipitation at welds or during fabrication.

It's easily cleaned—in place, by backwashing with pre-filtered fluid or inert gas; or, when removed, with suitable solvent. May be sterilized with live steam for food or drug processing; or will filter rust and scale from steam used for other cleaning or sterilizing.

Its porosity is closely controlled. Four standard grades cover the range from 3- to 30-micron statistical particle retention.

Standard designs. For most applications standard housings and elements are available.

Get all the facts on Cuno's new Poro-Klean filter for your chemical or process applications. Write Cuno Engineering Corporation, 32-2 So. Vine Street, Meriden, Conn.



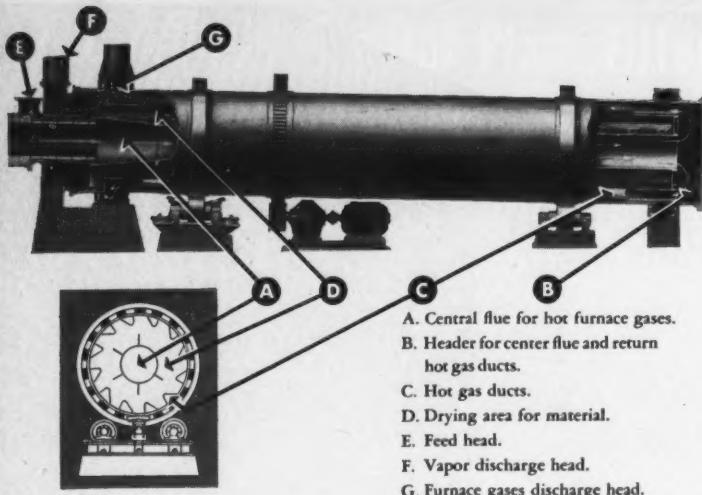
THIS PORO-KLEAN FILTER handles 180 gpm of naphtha at 400°F. Operating pressure: 700 psi ASME Code with 5 psi pressure drop. It's cleaned by back-flushing with nitrogen. Cell-type Poro-Klean filter elements (large picture at top) have large surface area. This unit is 54" L x 9" O.D. and is designed for 1500 psi pressure drop and 550°F.



ENGINEERED FILTRATION

Removes More Sizes of Solids From More Kinds of Fluids

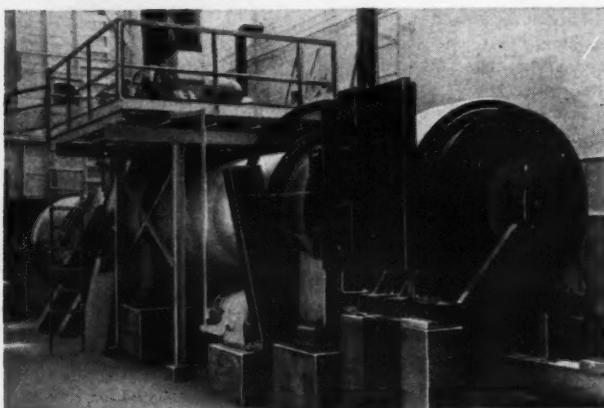
AUTO-KLEAN (edge-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound) • PORO-KLEAN (porous metal)



Ruggles-Coles INDIRECT-FIRED DRYERS and HEATERS

- Dry without contamination from combustion gases, regardless of fuel.
- Minimize auxiliary dust collection when handling fine precipitates and filter cake.
- Heat pulverized materials for process work.
- Collect vapors at high concentration.
- Available fabricated with heat and corrosion-resistant metals.

Ruggles-Coles
Indirect
Heat Dryer
handling
200 mesh talc.



Write for complete specifications. Ask for Bulletin AH-438-13

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works
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When inquiring check CP 3731 opposite last page

PROCESSING

High-speed tablet press produces up to 2500 tablets/min

Uses: Various tabletting operations, compacting ceramics, powder metals, plastic preforming.

Features: With 33 stations, unit can make tablets up to 1-1/16" diameter and 1-1/8" depth of fill at rates from 900 to 2500 per



Low roll pressure provides greater protection for tooling

minute. With 27 stations, press produces from 700 to 2000 tablets per min having max diameter of 1-3/16" and 1-1/8" depth of fill.

Description: Machine is designed for flexibility of adjustment, easier and more precise control, and minimum maintenance. Design features include: hydraulic loading of upper pressure roll, "non-drop" inserts in lower pressure roll, "anti-jump" retainers on lower cams, individual die screws, and large-diameter punch circle.

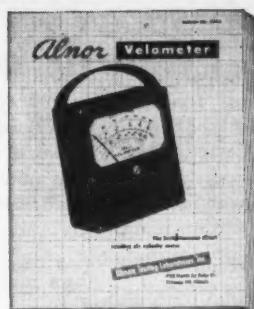
Roll pressure on the 10-ton machine is low — 36,000 lb per inch of displacement — providing greater protection for tooling and longer life for moving parts. Neckless punches are used. Centralized gear-operated lubrication system supplies oil to all vital parts.

(Model 533 tablet press is product of Stokes Machine Co., Inc., Dept. CP, 5500 Tabor Rd., Philadelphia 20, Pa. Check CP 3732 opp. last p.)

FREE

ILLUSTRATED BULLETIN

How you can save time by measuring air velocities with an ALNOR VELOMETER



Developed to facilitate quick and easy determination of air velocities, the Alnor Velometer is a compact, precision instrument that provides instantaneous, direct readings in feet per minute, without timing, calculations or reference to conversion tables. Guaranteed accurate, in ranges from 20 f.p.m. to as high as 24,000 f.p.m. Also available with metric or miles-per-hour calibrations.

Tear out this ad and mail it with your business letterhead to Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.



PRECISION INSTRUMENTS FOR EVERY INDUSTRY

When inquiring check CP 3733 opposite last page

alphabetical index

on page 222

... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 222.

"Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago.

It means extra work for the Editors, but it helps you, the reader, in finding what you want... in a hurry!

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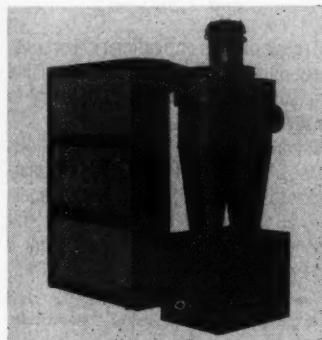
**Compact dust collector
features glass wool
after-filter . . .**

removes fine particles not trapped in main cyclone

Uses: Removing or recovering dust, lint, chips, powders, and fumes from air.

Features: Depending upon particle size and sp gr, efficiency of unit varies from 75 to 95 per cent. Thick pads of glass insulation wool on each of two open surfaces on after-filter remove any fine particles not trapped by collector.

Description: Unit consists of two basic parts — a cyclone-type collector and an after-filter. Collector measures 93½" high, 30" deep, and 24" wide. After-filter is 81" x 51" x 14". Collector has

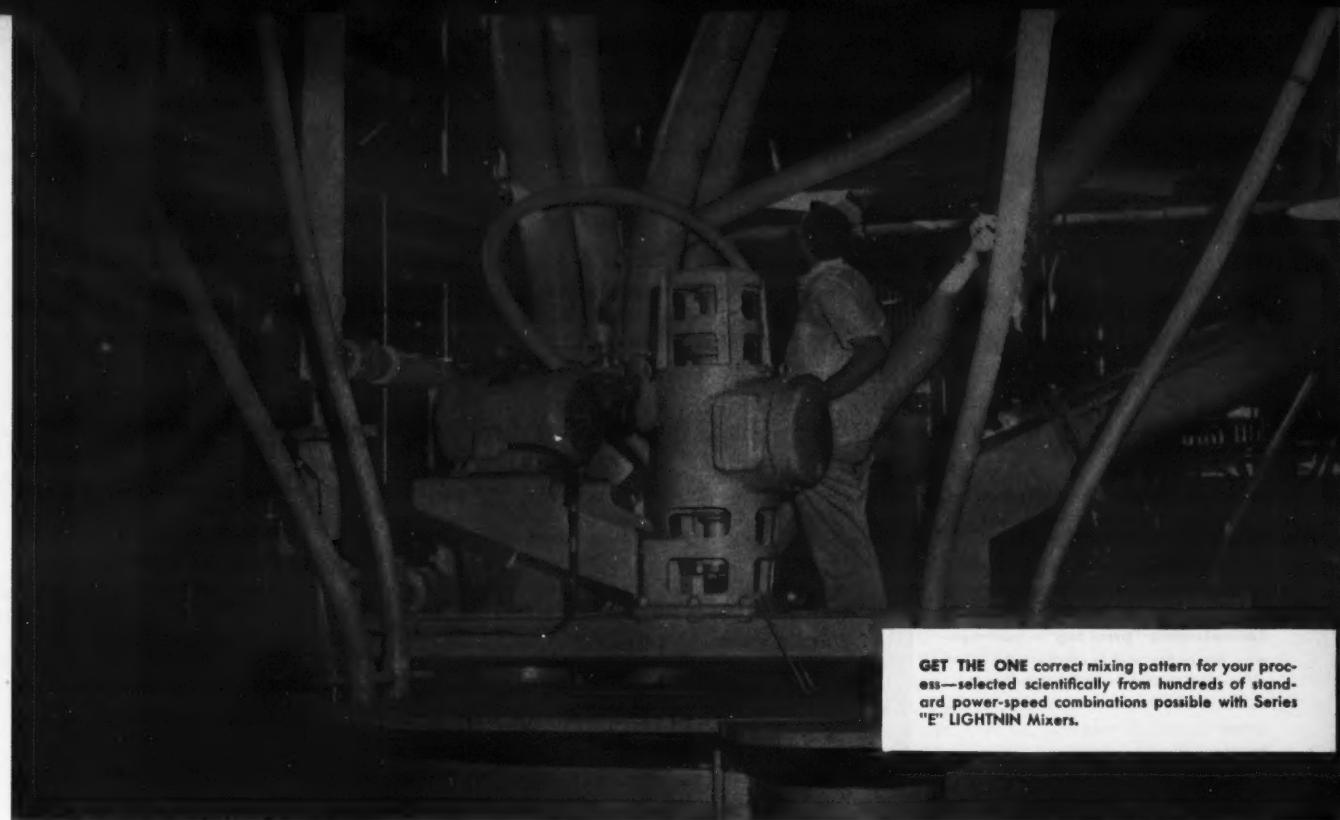


Collector's efficiency varies from 75 to 95 per cent, depending upon application

4½ cu ft capacity. Its 5-hp, 3450-rpm motor draws 2100 cu ft of air per minute through the 8" inlet at a static pressure of 3.0". After-filter's filter pads are easily replaced.

(Torit 219 FM-A dust collector is product of Torit Manufacturing Co., Dept. CP, 287 Walnut Street, St. Paul 2, Minn. . . or for more information check CP 3735 on form opposite last page.)

For more information on product at right, specify CP 3736 . . . see information request blank opposite last page.



GET THE ONE correct mixing pattern for your process—selected scientifically from hundreds of standard power-speed combinations possible with Series "E" LIGHTNIN Mixers.

International Minerals & Chemical Corporation

How to outsmart fluid mixing costs

When you plan to mix fluids, cast a sharp eye at the *long-term cost factor*. It can make the difference between success and failure of a process.

Choose a mixer that's engineered to keep your mixing costs in line—for the next 10 years or more.

Here's the cost side of the LIGHTNIN Mixer story. It's your ticket to mixing that does what you want it to do, at lowest possible long-term outlay:

1. Save when you buy—When you specify LIGHTNINS, you eliminate guesswork and false starts. From the start, you're covered with a performance guarantee, based on scientific mixer selection and scale-up. You get the mixing you want, without paying for unwanted horsepower. And you save on installation,

because LIGHTNINS arrive fully assembled, factory-aligned, ready to mount and run, without extra construction.

2. Save while you mix—You minimize shutdowns when you mix with LIGHTNINS. Hundreds of LIGHTNINS have been in service 20 years and longer. If you ever need to, you can get standard impellers, shafts, replacement parts from factory stock, shipped on 24 hours' notice.

3. Save if you ever convert—Comes time for a process change, and you can in all probability adapt your LIGHTNINS to handle new mixing requirements. Impellers, shafts, tank mountings—yes, even speeds—are quickly interchangeable, using standard stock components. You can, for example, switch the same

standard Series "E" LIGHTNIN from open-tank to closed-tank service; from top-entering to bottom-entering mounting; and through a full range of standard speeds from 16.5 to 420 RPM. It's the smart way to beat mixer obsolescence.

For fluid mixing to make a new process pay out faster—or keep an older process competitive—call in your LIGHTNIN Mixer representative. (You can find his name in Chemical Engineering Catalog.) Or write us direct.

Lightn' Mixers
MIXCO fluid mixing specialists

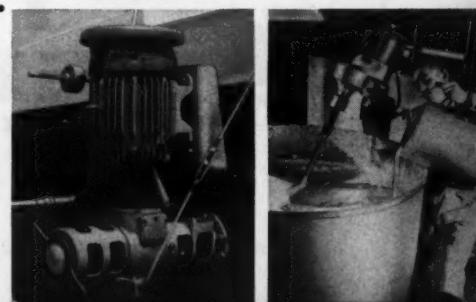
Left: REALIZE lowest possible upkeep in big-tank mixing, with LIGHTNIN Side Entering Mixers. Right: MAKE ANY OPEN TANK a mixing vessel, with a LIGHTNIN Portable Mixer. Thirty models, many modifications.

FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

- B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP
- B-103 Top entering; propeller types: ¼ to 3 HP
- B-108 Portable: ½ to 3 HP
- B-104 Side entering: 1 to 25 HP
- B-112 Laboratory and small-batch production types
- B-109 Condensed catalog showing all types
- B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing
- B-107 Data sheet for figuring mixer requirements

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc. 185-b Mt. Read Blvd., Rochester 11, N. Y.
In Canada: Greer Mixing Equipment, Ltd., Toronto 10, Ont.



WHAT'S THE PRICE OF THIS AGITATOR?

There are three "price tags" that add extra value to the purchase price of a Nettco Agitator. These are:

The engineering "price tag" — your assurance the Nettco drive is the right size, the right speed, the right horsepower, the right shaft diameter — backed by Nettco's over 50 years of serving the agitation needs of industry.

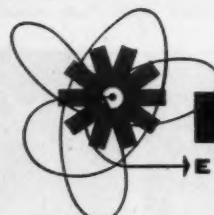
The operating "price tag" — your assurance the Nettco unit is engineered for low power consumption and high productivity — two vital economy factors in any processing system.

The maintenance "price tag" — your assurance the Nettco drive will minimize maintenance: with a minimum of moving parts — all conservatively rated.

Next time use Nettco — for engineered agitation that's lowest cost in the long run. Send for data and recommendations, to New England Tank & Tower Company, 93 Tileston Street, Everett 49, Massachusetts.



Installation of Nettco Agitators in new multi-million dollar dyestuff plant — complete plant served by Nettco Engineered Agitation.



NETTCO
ENGINEERED AGITATION

When inquiring check CP 3737 opposite last page



HELPFUL NETTCO CATALOGS

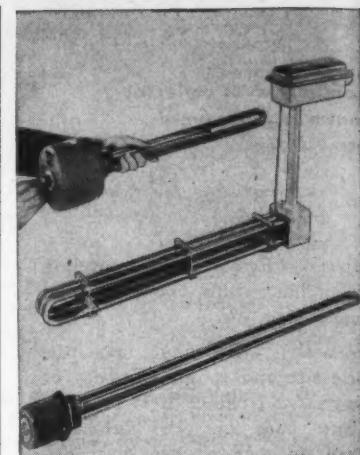
- General Bulletin No. 551
- Side Drive Agitators, Bulletin No. 532
- Nettco Flomix®, Bulletin No. 531

PROCESSING EQUIPMENT

Girdler Company receives mixer, blender rights

Licensing agreement has been concluded between The Girdler Company and the American Machine & Foundry Company, making Girdler the exclusive manufacturer of the A.M.F. continuous mixer and the A.M.F. continuous disc blender. Agreement also gives Girdler exclusive right to market the equipment, except in the foam rubber, bakery, butter, and margarine fields.

(Information from The Girdler Company, a division of the National Cylinder Gas Company, Dept. CP, Louisville 1, Kentucky.)



CHROMALOX Electric IMMERSION HEATERS

with or without
built-in thermostats

... fit the heat to your need
up to 100,000 watts
and 2,500 psi

Full range of sizes and ratings in portable, screw-plug and flanged types. Available with copper, steel or alloy sheaths to resist corrosion.

Used for heating water, asphalt, greases, molten salts, pickling and plating baths, process kettles; for super-heating steam and compressed air; for melting lead, solder, babbitt; and for a wide range of similar applications.

Let the Chromalox Sales-Engineering staff solve your heating problems... electrically.

Write for your copy of Catalog 50

— for full information on the complete line of Chromalox Electric Heaters and controls.

For ideas on additional applications of electric heat, request Booklet F1550—"101 Ways to Apply Electric Heat."



Edwin L. Wiegand Company
7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania

EDWIN L. WIEGAND COMPANY
7517 Thomas Boulevard, Pittsburgh 8, Pa.
I would like to have . . .
 a copy of Catalog 50
 a copy of "101 Ways"
 a Sales-Engineer contact me.

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

A-4487A



Mill's grinding chamber and cover are hinged, permitting operator to open machine for cleaning in less than two minutes

When inquiring check CP 3738
opposite last page

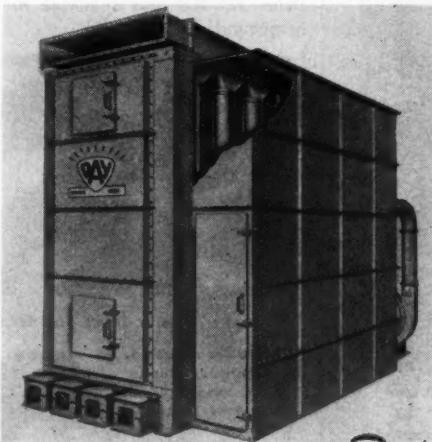
CHEMICAL PROCESSING

carrying them up to the separator where fines are vented to attached dust collecting device, whose fan induces upward air blast. Over-sized particles drop back for regrinding.

Continuous blast of air helps maintain low grinding temperature and permits handling of a wide variety of heat-sensitive materials without the aid of artificial coolants.

Model 13 requires floor space of about 10 square feet. Its overall height is approximately 3 feet. Unit is driven with a 3-7½ hp motor. Mill's grinding chamber and cover are hinged, permitting operator to prepare machine for cleaning without undue effort. A larger production unit, Model 30, powered by a 30-60 hp motor, is also available.

(Mikro-Bud pulverizers are product of Pulverizing Machinery Division, Metals Disintegrating Company, Inc., Dept. CP, 133 Chatham Road, Summit, New Jersey . . . or for more information concerning this manufacturer's product, check CP 3739 on convenient Reader Service slip which is located opposite last page.)

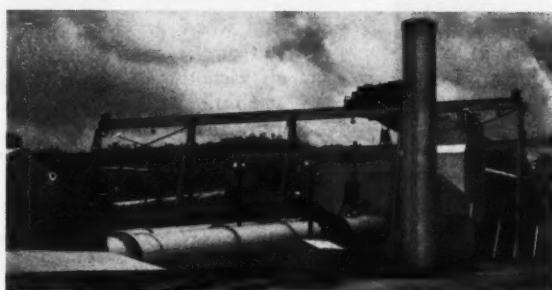
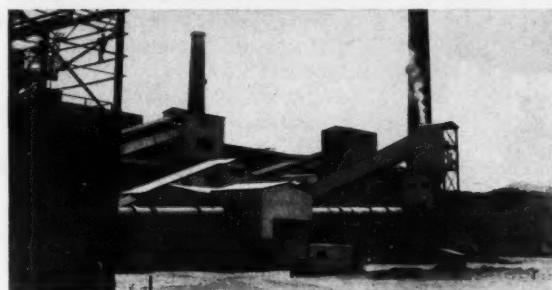


Housing speeds dust filter inspection

Newly designed housing on reverse-jet dust filter has walk-in access door and two inspection doors. Former provides convenient entry into filter housing for examination or maintenance. Latter are located at top and bottom of filter chamber, and permit periodic lubrication and inspection of gearmotor drive which operates reverse-jet blower and screw conveyor discharges.

(Hersey-type dust filters are product of The Day Company, Dept. CP, 810 Third Avenue N. E., Minneapolis, Minn. Check CP 3740 on convenient Reader Service slip which is located opposite last page.)

IMPROVING QUALITY . . . REDUCING COSTS FOR LEADING CHEMICAL PROCESSORS



Throughout the chemical industry . . . wherever you find a sizeable thermo-processing operation . . . you'll find a Traylor Rotary Kiln on the job protecting product quality, reducing maintenance bills and lowering production costs.

Traylor's half-century of engineering experience has produced many major improvements that have become accepted standards for modern kiln design. Cast steel or forged steel riding rings, of the full-floating type are specially mounted to hold them securely in place relative to the easily adjustable single roller supports. The roller supports are of heavy integral design and can be adjusted as a unit. The shells are extra heavy with ample reinforcing bars. Thus, Traylor Kilns achieve exceptional thermo-processing and maintenance economies.

The success of Traylor Rotary Kiln design is best emphasized by the large number of leaders in the processing industries who have returned time after time to purchase additional Traylor Kilns.

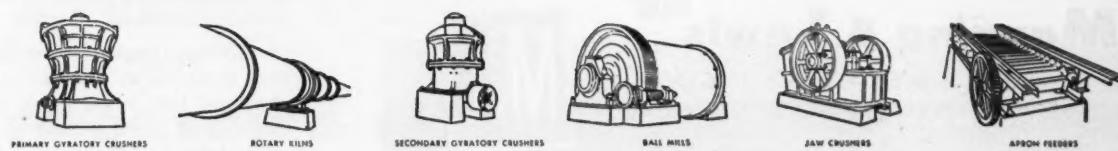
Traylor has custom built Rotary Kilns in sizes to 12' in diameter and 450' in length. For full specifications on a kiln to best suit your specific product, write for a free copy of illustrated bulletin 1115 outlining the features of Traylor Rotary Kilns, Coolers and Dryers.



TRAYLOR ENGINEERING & MFG. CO.

842 MILL STREET, ALLENTOWN, PA.

SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfr: Canadian Vickers, Ltd., Montreal, P.Q.



When inquiring check CP 3741 opposite last page

PROCESSING EQUIPMENT

*Quality
Fabrication
is our Business*

Whether it's a kettle, reboiler, reactor or other process equipment, Manning & Lewis engineers and craftsmen are ready to design and fabricate a unit, tailor-made to fit your particular process need, and priced to fit your budget.

You need only supply the performance requirements. An experienced M & L engineer will take it from there and specify type, size, method of construction, etc.—all the essentials that have made Manning & Lewis equipment preferred in plants from coast to coast.

Send your inquiry
or have a
M & L representative call.

No stuffing box, packing, seal on magnetic agitator

Can't leak oil or grease; ideal for high-pressure and vacuum reactors

Uses: Mixing contents of small-capacity, high-pressure reactors.

Features: Agitators are hermetically sealed. There are no stuffing boxes, packings, or seals of any sort. High vacuums can be handled easily, since absence of stuffing box eliminates possibility of oil or grease entering vessel.

Description: Operating principle of magnetic agitator is relatively simple. A core of soft iron (armature) is caused to move by energizing and de-energizing a solenoid coil. The coil lifts the agitator when it is energized; a spring and gravity return it to its original position when coil is de-energized. The core moves in a non-magnetic tube attached to the reactor.

Heart of the agitator is the timer which controls the current going to the coil. There are two types of timers available: 1) the "mechanical" timer, and 2) the "automatic" timer. Former operates agitator a precise number of cycles per second. It is recommended where reactions are mostly in the liquid phase. Latter allows viscosity of material in reactor to determine the rate of reaction, is useful where gas dispersion is required. Circuitry of the automatic timer is such that the agitator must go through its full stroke before reversal can take place.

Agitator has several distinct advantages:

- 1) Since there is no stuffing box, all available power is used to agitate the liquid.
- 2) Baffles are not necessary, since the agitator is constantly reversing direction.
- 3) Gas entrainment is excellent. Top agitator plate is so placed that half of stroke is in gas phase and half in the liquid phase. When plate enters liquid phase on downward stroke, it pulls gas in behind it. Other plates keep gas entrained and distribute it through the liquid phase.



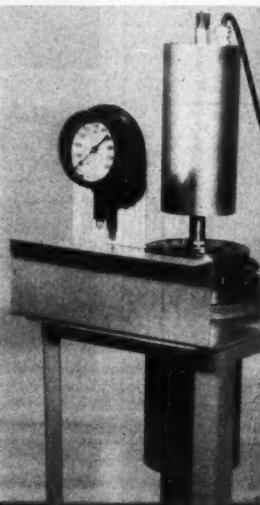
When inquiring check CP 3742 opposite last page



FERRO FILTER

Magnetic Separators

provide the positive method of extracting microscopic iron particles from liquids and slurries. A strong electromagnet magnetizes the grids which attract and remove from suspension even feebly magnetic particles. Models also available for finely ground dry materials.



Agitators are available for vessels ranging from 100-ml to five-gallon capacity



Here's how iron collects

Those black ridges are iron particles clinging to the edges of a magnetized grid of a wet-type FerroFilter. From 16 to 30 grids are in each FerroFilter dividing the liquid into thin elements, attracting and holding magnetic particles until current is shut off and the separator cleaned.



Send for BULLETIN 56-E

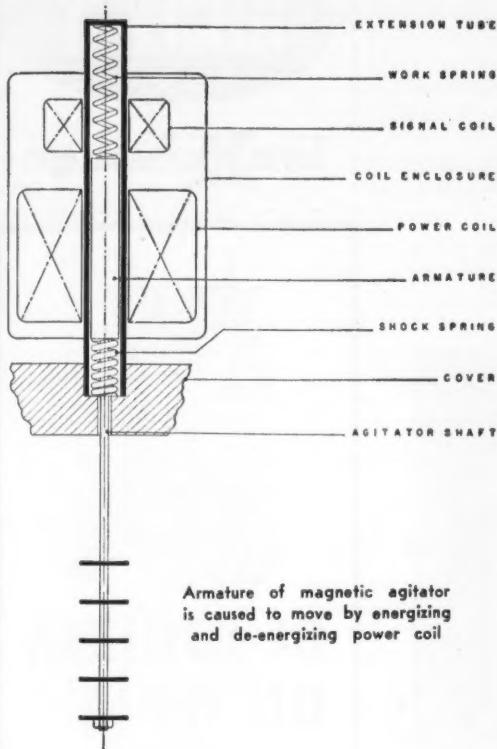
S. G. FRANTZ CO., Inc.

Brunswick Pike and Kline Ave.
P. O. Box 1138 Trenton 6, N. J.

When inquiring check CP 3743
opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT



- 4) Good catalyst dispersion is possible.
- 5) With proper degreasing, reactions involving oxygen can be carried out.

Particular attention has been paid to developing units with adequate power. For violent agitation, agitator should complete three to five cycles per second. With drives developed to date, units are able to agitate vessels ranging in capacity from 100 ml to five gallons. Larger drives are being currently developed for reactors up to 50 gallons.

(Recipromix magnetic agitators are products of Pressure Products Industries, Inc., Dept. CP, 412 South Warminster Road, Hatboro, Pa. . . . or for more information check CP 3744 on form opposite last page.)

**Clarifiers re-use
waste water**

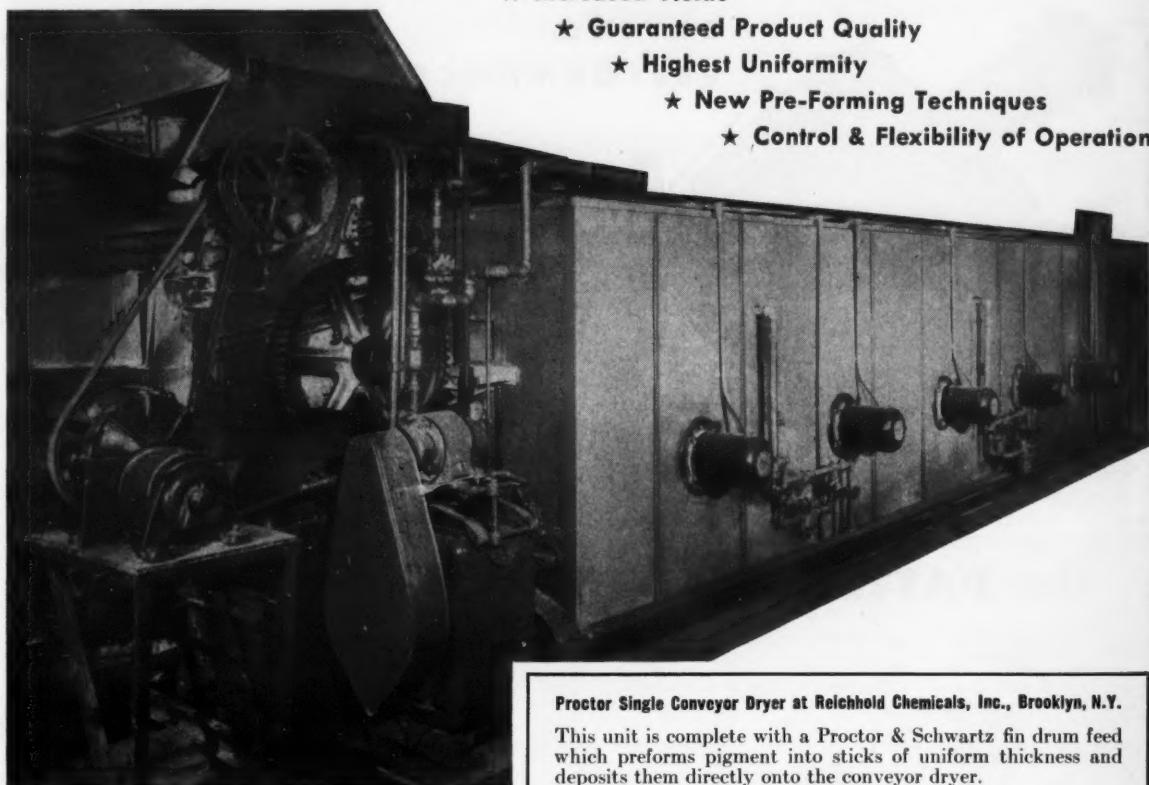
Concentrating centrifugal clarifiers with recycling system that re-uses waste water are described in four-page bulletin. Booklet shows complete line and includes cutaways, technical data, and capacity charts.

Bul 2116 is issued by Centrico Inc., Dept. CP, 75 W. Forest Ave., Englewood, N.J. When inquiring specify CP 3745 on form which is located opposite last page.

More PROFIT with PROCTOR!

PROCTOR DRYING RANGES OFFER:

- ★ Increased Yields
- ★ Guaranteed Product Quality
- ★ Highest Uniformity
- ★ New Pre-Forming Techniques
- ★ Control & Flexibility of Operation



Proctor Single Conveyor Dryer at Reichhold Chemicals, Inc., Brooklyn, N.Y.

This unit is complete with a Proctor & Schwartz fin drum feed which performs pigment into sticks of uniform thickness and deposits them directly onto the conveyor dryer.

Proctor Drying Ranges make possible continuous conveyor drying of many materials formerly dried by batch processing.

Use of these ranges means

- More Profit
- Uniform Drying
- Consistent Quality of Product

Proctor equipment carries performance guarantees based on wide experience and careful analysis of your requirements.

Write for complete information

- **Tray Dryers**
- **Truck Dryers**
- **Spray Dryers**
- **Other Proctor Equipment for use in the Process Industries.**



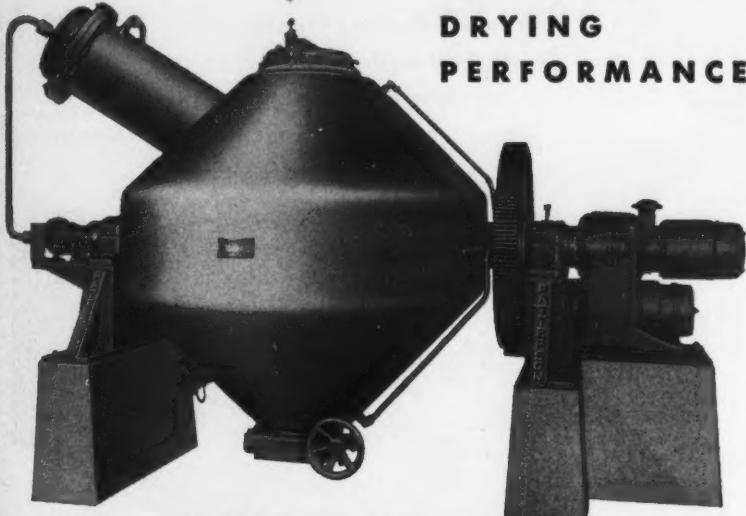
PROCTOR & SCHWARTZ, Inc.

Manufacturers of Industrial Drying
Equipment and Textile Machinery
Philadelphia 20, Pa.

When inquiring check CP 3746 opposite last page

Typically Patterson

IN FINE
DRYING
PERFORMANCE



the PATTERSON

Conaform

VACUUM DRYER

Old-style drying methods can't compete with new-style CONAFORM efficiency! Uniform, rapid heat transfer joins with faster vapor removal to dry batch quickly—gentle handling of product, dustless discharge valve, and remarkable cleaning ease are extras that add to an outstanding Patterson value. Send for the Conaform story.

Richard L. Cawood
President

The Patterson Foundry and Machine Company
East Liverpool, Ohio, U. S. A.

NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI,
ATLANTA, CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO,
SEATTLE

The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

When inquiring check CP 3747 opposite last page

PROCESSING EQUIPMENT

Wet or dry operation possible with efficient dust collector . . .

removes 100% of 0.1-micron particles when wet, 0.5-micron particles if dry

Uses: Collecting wide range of materials including alumina, charcoal, mica, vermiculite, limestone, gypsum, silica sand, similar products.

Features: Machine can be operated either as dry or wet collector. Simplicity of design results in minimum operating and maintenance costs.

Description: Collector functions by discharging incoming dust-laden air or gas against rotating deflector plates which are mounted on a power-driven shaft. This reverses direction of air-flow, dropping out heavier particles. The air or gas then continues upward through a series of rotating separator blades where additional material is blown out. The small fraction of dust which passes the blades is thrown against outer shell by centrifugal force, and discharged through adjustable slots to bottom of machine.

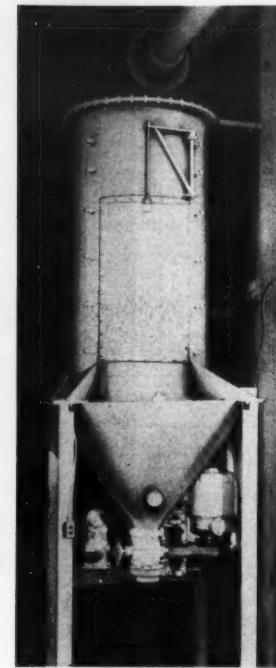
In dry collecting, unit will remove particles down to 0.5 micron, with 100 per cent collection in many operations. In wet collecting, it will remove particles 100 per cent down to 0.1 micron. Thirteen capacities, from 300 to 30,000 cfm of gas throughout, are available, with total hp of 15 used on largest unit.

(Dust collector is product of Majac, Inc., Dept. CP, Sharpsburg, Pa. Check CP 3748 opposite last page.)

Tells dimensions, capacities of shell, tube heat exchangers

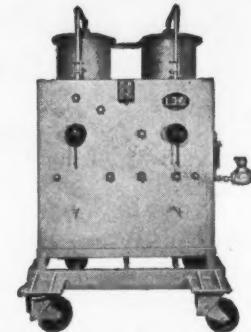
Illustrated 12-page bulletin gives data, dimensions, and capacities of shell and tube heat exchangers. Literature stresses standardized production units available for wide range of uses.

Bul 31 is issued by Buxton Mfg. Co., Dept. CP, Dover, N. J. Check CP 3749 opposite last page.



Bagless dust collector has simple design

ionXchange



DE-IONIZER ON WHEELS

With this new unit, you can do your de-ionizing wherever you want to, because the "wagon" is completely self-contained and fully portable. We have made a number of similar arrangements for various specific purposes (such as the recovery of chromic acid from each of a string of plating tanks) but this is a general-purpose unit, primarily for the demineralization of water, but adaptable to other uses as well. It is available in either Two-Bed or Mixed Bed models.

PROVIDES DE-IONIZED WATER WHERE AND WHEN YOU WANT IT

Operation is simple. You pull the unit right up to the most convenient location, hook up inlet and outlet hoses or pipes, run the process as long as needed, disconnect the unit, and haul it away to the next job. Regeneration is accomplished at some central point where a drain is handy and regenerant can be stored. If something like this has a place in your plant, please write for further details.

ILLINOIS WATER TREATMENT CO.

ionXchange



903 CEDAR ST.
ROCKFORD,
ILLINOIS

NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N. Y.
CANADIAN DIST. PUMPS & SOFTENERS, LTD. LONDON, ONT.

When inquiring check CP 3750
opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

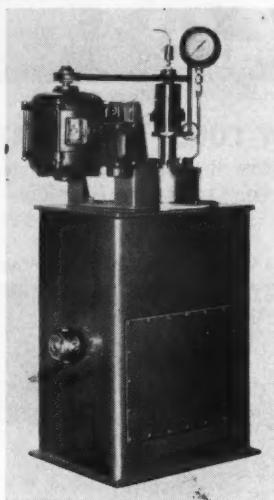
Packaged autoclaves withstand up to 30,000 psi . . .

available in 1-liter to 20-gal sizes

Uses: Conducting high-pressure reactions in laboratory, pilot plant or small batch operations.

Features: Units are available in pressure ranges from 500 to 30,000 psi.

Description:



Autoclave has enclosed base as added safety feature

(High-pressure autoclaves are product of High Pressure Equipment Company, Inc., Dept. CP, 1222 Linden St., Erie, Pa. Check CP 3751 opp. last page.)



"And that, gentlemen, is how our paint blender works . . . of course the lid should be on while operating . . ."

MEET THE

production champions OF THE process INDUSTRY

You need

COWLES
DISSOLVERS

If you process . . . Plastics, Resins, Paints, Vitamins, Plasticols, Nitro-Cellulose Lacquers, Rubber Solutions, Inks, Various Chemical Agents, Organisols, Gum Solutions, Enamels, Biologicals, Coatings, Explosives, Foods.

Because you are guaranteed . . .

FASTER DISSOLVING • FASTER ULTIMATE DISPERSION
• SAVINGS IN TIME, SPACE, LABOR, MAINTENANCE
COWLES DISSOLVERS are actually 2 to 20 times faster than conventional dissolving-dispersing equipment as the Cowles ultra-fast impeller whirls at speeds up to 7500 f.p.m. This keeps the batch in constant circulation, eliminating dead spots and surface splash — minimizing sedimentation.



COWLES DISSOLVERS are engineered to meet your specific requirements — designed to fit into and add speed to your present production line. The Dissolver's versatility often allows it to do the job of two or more conventional machines.

Atenção! Temos
util literatura
em uma varie-
dade de línguas.
Escreve-nos
em a sua
língua.

MOREHOUSE
COWLES

You need

MOREHOUSE
MILLS

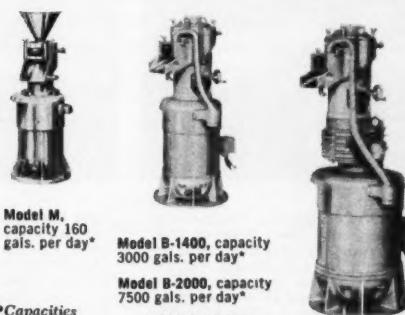
If you process . . . Paints, Inks, Foods, Chemicals, Plastics, Lubricants, Ceramics.

Because you are guaranteed . . .

• FASTER PARTICLE REDUCTION • SMOOTHER, FINER END PRODUCTS • THE ULTIMATE IN FINISHED MILLING • ACCURATE REPRODUCTION OF GRIND REQUIREMENTS

MODERN MOREHOUSE MILLS are used the WORLD over to improve both corrosive and non-corrosive materials . . . for grinding, homogenizing, emulsifying, dispersing, disintegrating, blending.

MODERN MOREHOUSE MILLS give you up to 4 times the volume of ordinary mills when used with conventional pre-mixers — with the Cowles up to 10 times more.



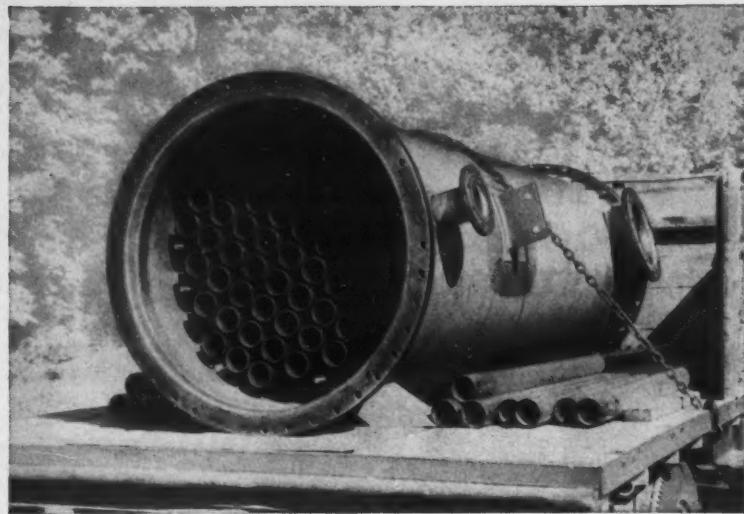
Individual mill capacities with ordinary pre-mix range from 160 to 7500 gals. per 8-hr. day — with Cowles much more.

You need both . . . working as a team to have the fastest, most economical, flexible production line.

TOGETHER MOREHOUSE-COWLES spell speed and speed spells higher profits. Both fully guaranteed. So before you buy any equipment at any price, write today for full information and free consultation.

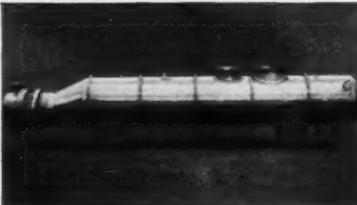
MOREHOUSE-COWLES, INC., 1150 San Fernando Road, Los Angeles, Calif. Sales Offices in Principal Cities (Cable Address "Morespeed," Los Angeles)

When inquiring check CP 3752 opposite last page



Special heat exchanger materials are well known at Downingtown!

Enamel-Lined Tubes. This stainless steel heat exchanger, with enamel-lined tubes, solved a serious set of problems which included high temperatures . . . heavy corrosion . . . intermittent operation . . . and a tight budget. It now operates at 150% of design capacity, at a temperature of 1200° F.—and the owner reports trouble-free service from his Downingtown unit. Dimensions: 28" diameter x 10' 0" long. Stainless steel shell. Tubes: 3½" O.D., lined with high temperature enamel.



Ampco 8—Downingtown engineered these two fixed tube sheet benzene condensers for export. Process conditions required copper alloy tube sheets, yet the customer did not want a gasketed joint between tube sheets and shell flanges. So we welded the Ampco 8 tube sheets directly to the steel shells, thus saving the cost of alloy shells. Dimensions: 14" diameter x 12' 0" long. Eighty copper tubes, 1" O.D. x 14 gauge. Ampco 8 tube sheets ½" thick. Ampco 8 heads ½" thick. Design pressure is 75 psi on shell and tube sides.

Solid Nickel—This solid nickel reboiler for vacuum service—one of eight identical units fabricated for one customer—was engineered by Downingtown to use a minimum amount of scarce and expensive materials. The double tube sheet construction required special assembly techniques. Notice the large nozzles, which were installed with a minimum of distortion by using proper care and skill during welding. Made of ¼" solid nickel. Dimensions: 34" diameter x 17' 0" long. Has 292 nickel U-tubes, 1" O.D. x 16 B.W.G.

We furnish complete thermal and mechanical designs, or fabricate to your plans. Send now for additional information.

Downingtown Iron Works, Inc.

Downingtown, Pennsylvania

New York Office: 52 Vanderbilt Avenue, New York 17, N. Y.



HEAT EXCHANGERS • TOWERS • PRESSURE VESSELS • STORAGE TANKS • STEEL AND ALLOY PLATE FABRICATION

Division of: Pressed Steel Tank Company, Milwaukee 14, Wisconsin • Manufacturer of Hackney Products

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check CP 3753 opposite last page

PROCESSING

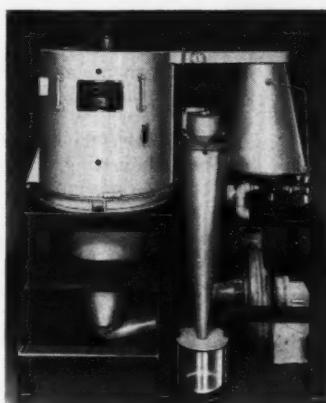
Laboratory spray dryer has drying-air rate of 250 cfm

Uses: Spray-drying material in lab or small-lot production work.

Features: Unit has drying-air rate of 250 cfm. Heat loads of up to 230,000 Btu/hr are possible, with an evaporation rate of up to 80 lb/hr.

Description: Dryer is designed for rapid disassembly and easy cleaning. Insulated stainless steel construction is used wherever product comes in intimate contact with dryer. Unit has conical-bottom drying chamber and dry solids are deposited in a Pyrex-brand glass product receiver.

Total holding time is only a few seconds — making unit suitable for processing heat-sensitive materials.



Laboratory dryer can drive off 80 lb of water an hr

Dryer offers choice of nozzle atomization, centrifugal atomization, or both.

Unit incorporates automatic temperature and flame-failure safety system. Two dial thermometers are furnished as standard equipment.

Optional equipment includes pneumatic opening device for drying chamber, automatically-controlled electric heater, and air-turbine-driven centrifugal spray machine.

(Laboratory spray dryer is product of Bowen Engineering, Inc., Dept. CP, 13 Station Road, North Branch, N. J. Check CP 3754.)



FULL CONE—HOLLOW CONE—FLAT SPRAY

Spraco has the most complete line of nozzles available anywhere — **IN STOCK**. Capacities range from $\frac{1}{8}$ pint/min. to 4000 gal./min. Bronze, cast iron, and stainless steel. Write for our nozzle catalog.

SPRAY ENGINEERING CO., 115 Central St., Somerville 45, Mass.



When inquiring check CP 3755 opposite last page



Four times more snag resistant, 10 times greater abrasion resistance and highest resistance to most industrial chemicals, acids and solvents makes Surety's Sureseal apparel the favorite wherever worker comfort, safety and lowest costs are paramount.

Write for bulletin with actual Sureseal samples in various weights and other synthetic swatches for special service.

THE SURETY
RUBBER CO.
Carrollton, Ohio

When inquiring check CP 3756 opposite last page

CHEMICAL PROCESSING

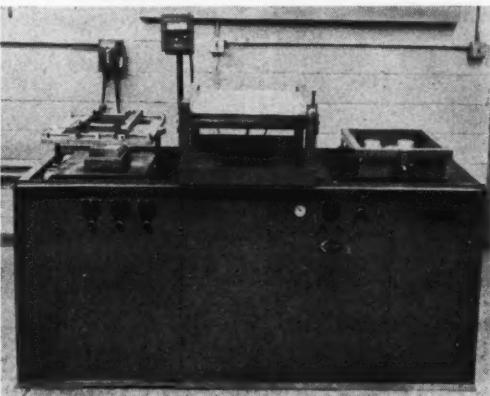
**Vacuum and drape forming
done at same time . . .**

press uses single 22 x 22" 3½-kw heater to perform both operations

Uses: Forming products, parts, displays, and packages from thermoplastic sheets.

Features: Dual controls and platens on either end permit one operator to conduct drape-forming and vacuum-forming runs simultaneously, using both male and female molds. Plastic, wood, metal, or plaster molds can be used.

Description: New machine is adaptation of manufacturer's model 88 (see CHEMICAL PROCESSING, October 1955, page 153). Requiring somewhat more floor space (28x90" vs 28x59"), unit has surface-ground 18x18" platens, vacuum valve timers, vacuum gage, 3-cfm vacuum pump, 15-gal vacuum



Vacuum-forming press has dual controls, platens on either end

surge tank capacity, and automatic cycle control of the vacuum operation. The 22x22" heater has 3½-kw capacity. Molds of any size from 2x2" to 16x16" may be used. Draws up to depth of 6" are obtainable. Cost of machine is reported about \$1500. (Model 88-FM vacuum forming press is product of Vacuum Forming Corporation, Dept. CP, 76 South Bayles Avenue, Port Washington, New York . . . or check CP 3757 opposite last page.)

**Answers questions about design
of clarifiers, thickeners**

Questions on design requirements of clarifiers and thickeners for a wide range of capacities and solids removable loads are answered in 16-page, graphically illustrated booklet.

Bul W-800B-S-6000B is issued by Inflico Inc., Dept. CP, Box 5033, Tucson, Arizona. When inquiring specify CP 3758 opposite last page.

HOW'S THIS FOR
MIXING CAPACITY?

CONTINUOUS MIXING

Effective arrangement of equipment is part of the National service. Photo shows No. 2F Mix-Muller (30 cu. ft. capacity) arranged to prepare ceramic body on a continuous basis for pug mill and deairing extruder. Mixer is charged from overhead bins.

SIMPSON MIX-MULLER[®] DIVISION
NATIONAL ENGINEERING CO., 640 Machinery Hall Bldg., Chicago 6, Ill.
(Not Inc.)

Here's the Handbook on Mulling. Write for your copy today!

When inquiring check CP 3759 opposite last page

CESCO RIGHT...before your Eyes!



Snap-fast Face Shield
with deflector crown



Open-top
Snap-fast Face Shield



Helmet-type Face Shield

NEW! CESCO All-Purpose Face Shield for general shop work

The CESCO 770 Face Shield comes in three window lengths of 4", 6" and 8" (top to bottom). The windows mount inside an aluminum channel in a tight assembly impervious to the entrance of dirt or liquid.

The head band of vinyl plastic is adjusted by a sliding strap. There is no metal or mechanical adjustment to snag the hair. The shield conforms easily to the head at all points. Windows are of cellulose-acetate and may be in either green or clear.

Contact your nearest CESCO distributor today or write for complete information and prices.

Write for complete Catalog

CHICAGO EYE SHIELD COMPANY

2316 Warren Boulevard, Chicago 12, Illinois

OFFICES IN: Atlanta, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Detroit, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City, D.F., Milwaukee, Montreal, Orange, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Mateo, Spokane, St. Louis, St. Paul, Toledo, Tulsa, Wichita



Full-visibility
Helmet-type Face Shield



Spark Shield

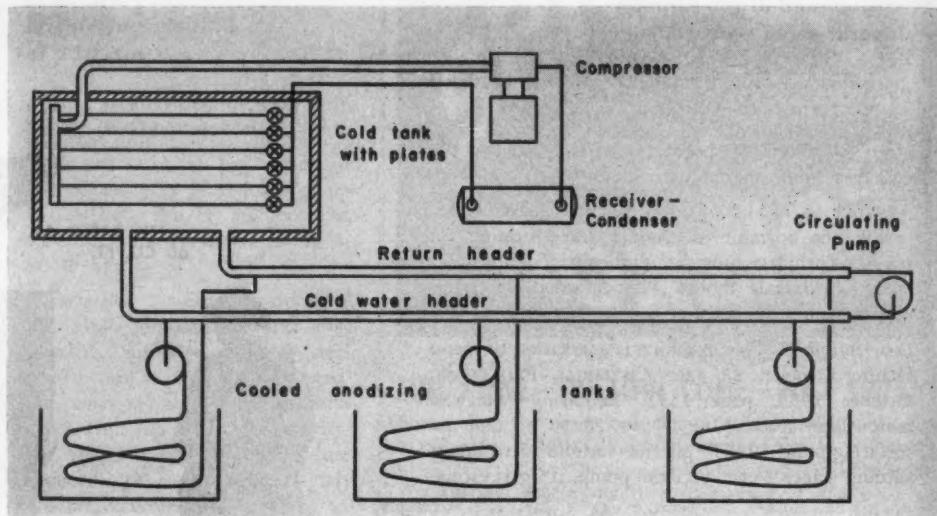
CESCO



FOR SAFETY

When inquiring check CP 3760 opposite last page

safety



Cold tank is interposed between compressor units and actual heat load

To avoid refrigerant contamination and resultant damage to compressors, Chicago Thrift-Etching Company has installed . . .

indirect refrigeration for sulfuric acid tanks

When sulfuric acid entered refrigeration coils through leaks, Chicago Thrift-Etching Co. lost two compressors from corrosion damage. Their new scheme will prevent this from ever recurring . . . and it might well be put to use in the many cases where refrigeration is an essential to some chemical process step.

Problem: In aluminum anodizing operations, 18% sulfuric acid solution requires refrigeration to maintain working temperature. In its anodizing section, Chicago Thrift-Etching Corporation, large producer of aluminum nameplates, was particularly concerned with protecting compressors in its refrigeration system. On two occasions, leaks in cooling coils have admitted acid into the Freon lines, causing complete loss of the compressor units.

Anodizing requires an acid temperature of between 68 and 72°F. To maintain this, company uses 40 tons of refrigeration. Previously, lead coils ran directly from compressors to anodizing tanks. Although coils are guarded, they are occasionally touched by aluminum parts dur-

By BILL SCHREMP, Assistant Editor
Verified by HERMAN WOLTER
Assistant Superintendent
Chicago Thrift-Etching Corporation

Send For This **FREE** Catalog!

... 28-page illustrated booklet contains factual information on methods of fire detection, fire prevention, fire control and fire extinguishment.



Cooling tank, with 6000-gal capacity, holds coolant for three anodizing tanks
CP Staff Photo

Sulfuric acid in anodizing tank must hold temps between 68° and 72°F
CP Staff Photo



ing anodizing process. Resulting arc can burn hole in coils, admitting acid to the system.

Solution: To prevent acid's reaching compressors, they decided to install an indirect refrigeration system. At first stage, two compressors of 15- and 25-ton capacities, cool water in a 6000-gallon tank. Fluid is kept at temperature just above freezing — between 35 and 39°F. Tank has small circulating pump to prevent icing-up of coils.

At second stage cooled water is circulated by individual systems to three anodizing tanks. Circulating pumps are triggered by thermostats at each tank. System is activated when anodizing tank temperature goes above 72°F. Cooled water is circulated until temp drops below 68°F.

Results: Since installation of this system, there has been no damage to compressors. Should leaks occur, they can be

detected at once and circulation halted, preventing any damage from leaking acid.

(Ice-Cel cooling plates for tank were manufactured by Dole Refrigerating Co., Dept. CP, 5910 N. Pulaski, Chicago, Ill. Check CP 3761 opposite last page.)

ENGINEERED SPECIAL HAZARD FIRE PROTECTION



*"Automatic" Sprinkler
CORPORATION OF AMERICA*

Offices in Principal Cities of North and South America

YOUNGSTOWN, OHIO

Complete Up-To-The-Minute-Data On

Application of SPECIAL HAZARD Fire Protection

Economics of SPECIAL HAZARD Fire Protection

Methods of Fire Detection

Methods of Fire Prevention, Control and Extinguishment

"Automatic" FIRE-FOG Systems

"Automatic" AIRFOAM Systems

"Automatic" CO₂ Systems

"Automatic" DRY CHEMICAL Systems

SPECIAL HAZARDS FIRE CONTROL

and EXTINGUISHMENT CHART

CLIP
AND MAIL

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

Dept. 10 — Box 360 — Youngstown 1, Ohio

Please furnish me with a copy of your Catalog 73—

"Engineered" SPECIAL HAZARD Fire Protection."

Name _____

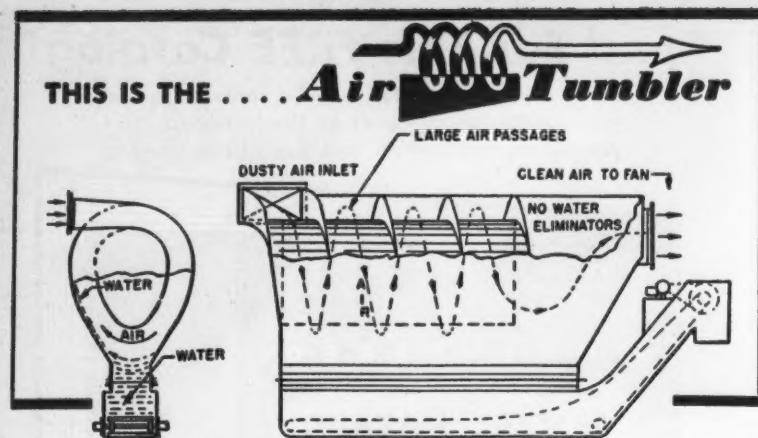
Title _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check CP 3762 opposite last page



the master of DUST in industry * * *

SIMPLE—DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST

Write for Bulletin No. 551. Address:

DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

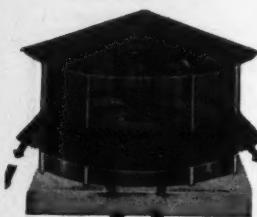
When inquiring check CP 3763 opposite last page



Safely Ventilate MOISTURE and FUMES

Three outstanding features make Air-Van (R) Power Exhausters especially suited to situations where moisture and fumes are present.

- The motor is out of the air stream.
- A positive air seal-off creates a constant curtain of fresh clean air around the motor shaft. This absolutely prevents fumes from entering the motor housing.



5,000-65,000 CFM.
S.P. to 4".

Patents
2188741 — 2526290
Patents pending

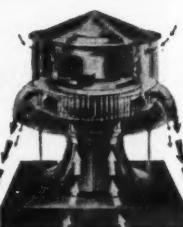
Patented scroll effect
design assures positive air
removal. Research has
shown that without scroll
effect, efficiency beyond
1/4" S.P. is impossible.

Other Gallaher features include low silhouette, weather-proof design, low noise levels, and availability in special metals and finishes.

The GALLAHER Company

Pioneers in Research-Designed Power Roof Exhausters
4108 Dodge St. Omaha, Nebraska

When inquiring check CP 3764 opposite last page



Direct Drive
150-11,000 CFM.
S.P. to 4.2"

SAFETY

Push on top, side, anywhere
with hand, elbow, knee,
switch makes contact . . .

unit, approved by Underwriters' Laboratories,
may be used singly or in series

Uses: Switch is suited for precise, involved, or dangerous manufacturing processes, where it is necessary that the worker have both hands free.

Features: Switch makes positive contact no matter where it is pushed, on top, or anywhere on



Switch, of molded plastic, and cord are approved
by Underwriters' Labs

its circumference. It can be activated with hand, elbow, or knee — whichever is more convenient for the operator.

Description: Unit operates on 110v, 10 amps, and measures 3-3/16" in diam and 1/4" in height. Outer shell is molded plastic with non-skid rubber base. Both switch and cord are UL-approved.

("Circumference Actuated" switch is product of The Birtcher Corp., Dept CP, 4371 Valley Blvd., Los Angeles 32, Calif. . . or for more information check CP 3765 on form opposite last page.)

Discusses safe handling of bulk chlorine

Discussing precautions to be taken in handling chlorine, 26-page booklet in two colors includes material on removing chlorine from cylinders and tanks. First aid measures in case of accident are suggested. Cylinders, ton tanks, tank cars, tank barges, and methods of removing liquid chlorine from them are discussed.

"Chlorine — Safe Handling" is issued by Columbia-Southern Chemical Corp., Sub. of Pittsburgh Plate Glass Co., Dept. CP, 632 Fort Duquesne Blvd., Pittsburgh 22, Pa. When inquiring specify CP 3766 on form opposite last page.

We challenge
you
to find better
**PROTECTIVE
CLOTHING!**



Toughest by Ted
FROG BRAND®



Illustrated
above:
3/4 length
coat

Sawyer

For every industry where personnel protection and safety are vital, only Sawyer Neoprene Latex Clothing offers all these advantages:

- 100% protection against oils, chemicals, alkalies, abrasion — and other hazards!
- "Exclusive Coating Process" . . . (for years and years of extra wear and durability) — original with Sawyer
- guaranteed not to peel, blister or crack in ordinary usage!
- double interlocked sewn seams that can't come apart!
- solid brass or non-conductive fastenings that can't rip off or corrode!
- designed for roomy, action-free comfort!

Sawyer clothing also Rubberized or Oiled. Full range of jackets, pants, coats, hats, aprons for more efficiency, more economy, more protection on every job!

**Make us
prove it!**

Send for complete details and price list.
The H. M. Sawyer & Son Company
A Division of Sawyer-Tower, Inc.
specialists in Protective Clothing for more than a century

5 Thorndike St., Cambridge 41, Mass.

When inquiring check CP 3767
opposite last page

CHEMICAL PROCESSING

SAFETY

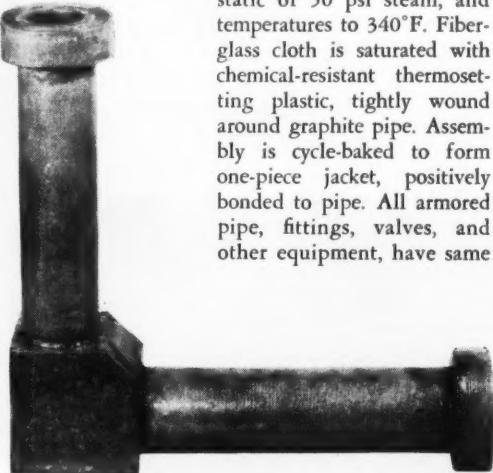
Protects against external shock, reduces explosion damage . . .

armor is impermeable, non-contaminating, and is immune to practically all corrosives

Uses: To improve durability of graphite piping for extremely corrosive materials.

Features: Application of glass-resin armor does not change the properties of the impervious graphite material in any way. Material is not affected by thermo-shock. It is impermeable, non-contaminating, and is immune to attack by most corrosives except some highly oxidizing agents.

Description: Piping is suitable for operation at pressures of 75 psi hydrostatic or 50 psi steam, and temperatures to 340°F. Fiberglass cloth is saturated with chemical-resistant thermosetting plastic, tightly wound around graphite pipe. Assembly is cycle-baked to form one-piece jacket, positively bonded to pipe. All armored pipe, fittings, valves, and other equipment, have same



Armored pipe and fittings have same dimensions as non-armored material

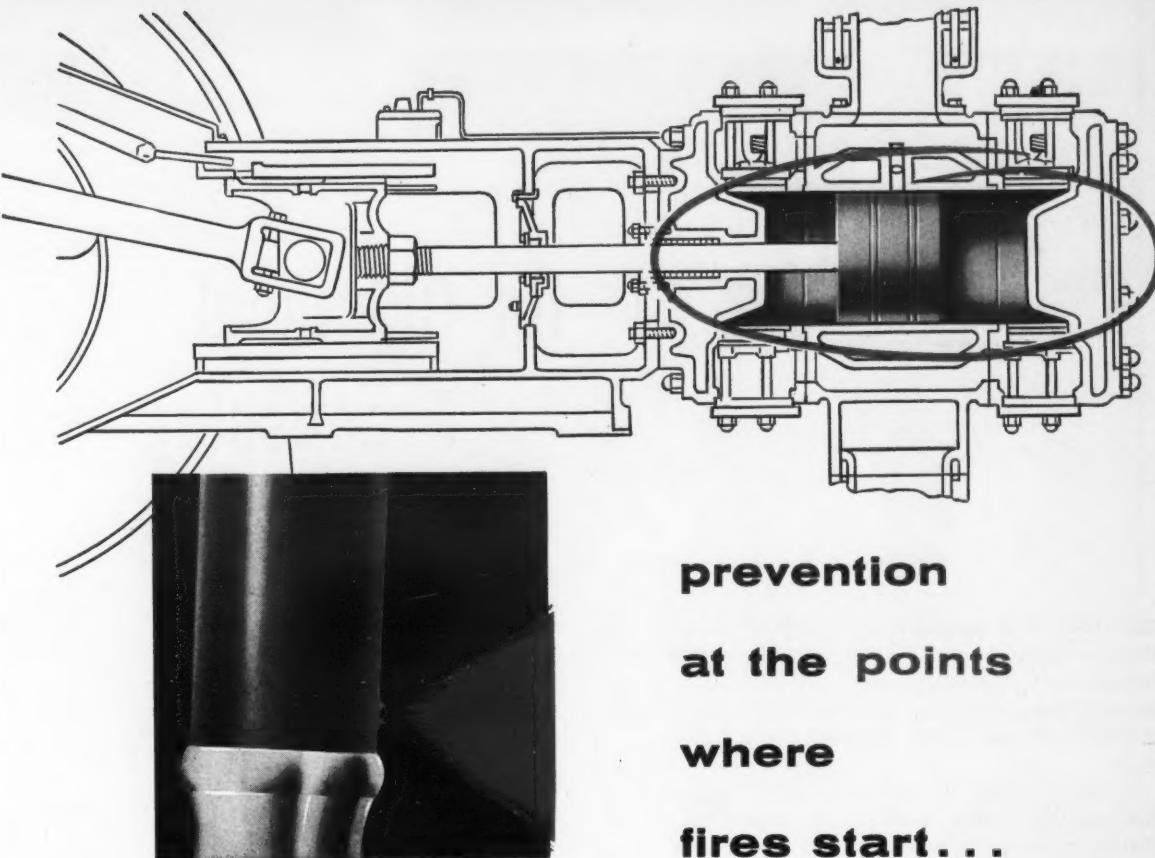
dimension as non-armored material. Thickness of glass-resin armor varies between 1/16" and 3/32" depending on size of equipment.

(Impervite impervious graphite pipe and fittings are produced by Falls Industries, Inc., Dept. CP, Aurora Rd., Solon, Ohio. Check CP 3768 opposite last page.)

Automatic watchman uses ultrasonics

Several installations of an ultrasonic burglar alarm are outlined in eight-page brochure. Printed in two colors, it clearly explains operation of the device. Some applications in the chemical plant are apparent.

"Ultrasonic Alarm" is issued by Diebold, Inc., Dept. CP, Canton 2, Ohio. When inquiring specify CP 3769 on form opposite last page.



**prevention
at the points
where
fires start . . .**

Fire-resistant Celanese* Cellulubes*

**Synthetic lubricants and power transfer fluids
are now available in 6 controlled viscosities**

Celanese Cellulubes are fire-resistant synthetic oils, designed to provide protection against fire hazards and explosion inherent in many industrial operations.

As air cylinder lubricants in compressed air systems, Cellulubes prevent the formation of excessive carbon deposits—No. 1 source of compressor fires and explosions. They are excellent lubricants—highly stable, non-corrosive, non-foaming.

As the hydraulic fluid in diecasting and similar critical operations, Cellulubes reduce the ever-present danger from uncontrollable fires due to line breaks or other failures. Chemical compounds that contain no additives, Cellulubes' physical properties are exceptionally stable under continuous duty.

6 CONTROLLED VISCOSITIES

With the expansion of the Cellulube series to 6 controlled viscosities: 90, 150, 220, 300, 550, and 1000 (S.U.S. @ 100°F.), the way is open to replace flammable fluids in many hazardous applications. If you would like to evaluate Cellulube in your own opera-

tion, use coupon below to order working samples and complete use data. Celanese Corporation of America, Chemical Division, Dept. 591-B, 180 Madison Avenue, New York 16, N. Y.

Celanese*
CHEMICALS

Celanese Corporation of America, Chemical Division, Dept. 591-B, 180 Madison Avenue, New York 16, N. Y.

Please send me working sample and technical bulletin on Cellulube for air compressor service _____ for hydraulic systems _____

Send technical representative _____

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check CP 3770 opposite last page



for Chemical Processing Advertisers*

The emblem at right is that of NBP—National Business Publications. You've probably seen it before on our contents page . . . rate card . . . or heading the CHEMICAL PROCESSING listing in Standard Rate & Data. Because we're proud of it.

It signifies that CHEMICAL PROCESSING has qualified for membership in the largest association of technical, scientific and professional journals in the United States. (We're proud, too, that our C.P. executive staff includes a past president of NBP and a member of its Board of Directors.)

But belonging to NBP is more than a feather in our publishing cap. It's an important *plus* for every advertiser in CHEMICAL PROCESSING. Here are the membership requirements. Judge for yourself:

- Unbiased editorial content
- Periodic reader interest evaluation
- Non acceptance of questionable advertising
- Periodic audit of circulation
- Uniform rates to all advertisers

In addition, NBP provides the framework for a continuing exchange of ideas among member publishers. The result: continuing improvement in publishing practices to make CHEMICAL PROCESSING more useful to its readers . . . more productive for its advertisers.



Chemical Processing

For men who manage
the Chemical Processing Industries

Published by Putman Publishing Company

Creators of PUTMAN-STYLE Magazines
Terse, vital editorial; "hand-picked" circulation;
square, high-visibility format; quality readership;
hence more READER ACTION



*Courtesy of the publication MEDICAL ECONOMICS, creator of this copy, here adapted to CHEMICAL PROCESSING.

SAFETY

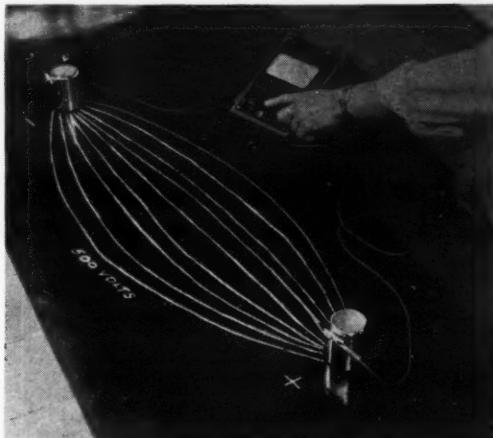
Increase conductivity of safety floors — maintain gloss

Waxes for conductive floors reduce explosion hazard

Wherever static electricity is a danger and conductive floors have been installed, it is necessary to maintain these floors with a wax that is also conductive. Most waxes and finishes are insulators — disrupting conductivity and enhancing possibility of an explosion.

Two waxes have been developed that permit floor to be maintained in a clean, glossy appearance while maintaining high conductivity.

One of these (approved by Underwriters' Laboratory) is a clear wax designed for all types of con-



Test of conductivity of floor is shown in progress

ductive flooring. Second special wax is designed for use with static-conductive linoleum, rubber, and other conductive floors which are black. Wax, too, is black.

Both of these provide a durable water-resistant finish. They may be polished to high luster.

Special cleansers have been developed for conductive waxed floors. These clean without destroying conductivity. Tests have indicated that conductive flooring should not exceed 25,000 to 1 million ohms resistance.

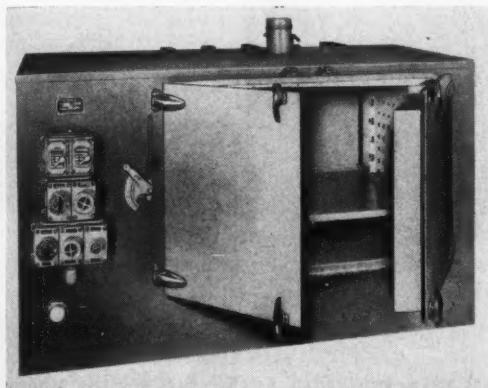
(VC-2C and H22 (black) wax are products of Huntington Laboratories, Incorporated, Dept. CP, Huntington, Indiana . . . or for more information about manufacturer's product reader may simply check CP 3771 on form which is located opposite last page.)

**Operates in explosive atmosphere,
provides safety controls . . .**

safety relief panel in rear of unit releases on internal explosion

Uses: Ovens are designed for use where ambient as well as oven chamber atmosphere is contaminated with flammable or explosive vapors. Suitable for use with atmospheres containing gasoline, naphtha, alcohol, liquid solvent vapors, and natural gas.

Features: All switches, pilot lights, thermostats, and relays are mounted in explosion-proof, flame-tight housings in accordance with Class 1 Group D specs. All connections are isolated from working chamber and are made by buss bar and welded circuits.



Oven controls are mounted in explosion-proof, flame-tight boxes in accordance with Class 1 Group D specs

Description: Safety relief panel, covering 75% of the rear of the unit, automatically releases in event of internal explosion. Oven is made in two temp ranges to 260°C, in floor and table-top models. Chamber temperature is controlled to $\pm .5^\circ\text{C}$.

(Explosion-resistant Ovens were developed by the Electric Hotpack Co., Inc, Dept. CP, 5033 Cottman St., Philadelphia, Pa. . . . or for more information check CP 3772 opposite last page.)

Explains fundamentals of tank venting

Printed in two colors, 12-page booklet discusses principles, operating conditions, fire protection, and maintenance connected with venting of storage tanks. Common equipment used for venting is described and compared. Engineering drawings of typical setups are included.

"Venting Fundamentals" is issued by The Protectoseal Co., Dept. CP, 1920 S. Western Ave., Chicago 8, Ill. Specify CP 3773 opp. last page.



Here's why this PETROCHEM fire hose is on guard throughout this D-X Sunray refinery

Get acquainted with your Quaker-Quaker Pioneer distributor. You'll find him of real help—not only for your regular needs—but also in emergency situations requiring extra fast supply. Write for free brochure and name of your nearest distributor.

This hose does more than fight fire. It fights off deterioration by oil and chemicals, stands up to abrasion, resists weather and functions safely under high pressure. Why? Because its oil-resistant Neoprene tube is enclosed in tough, wear-defying Du Pont Dacron impregnated with oil-proof Neoprene . . . this provides a tough, light, flexible hose, resistant to oil, both inside and out. Actually this hose is so strong that it can take pressures up to 500 lbs. and temperatures up to 300°F. . . . and so flexible that you can actually knot it. Easy to store, too! Either coiled or folded it takes little space.

These are some of the reasons why D-X Sunray's Oklahoma refinery has this hose . . . the first made for oil and chemical industries, at all fire stations . . . and why it will pay you to consider it in your safety planning. Complete Quaker-Quaker Pioneer line includes hose for every purpose, belting, packing and moulded rubber for every use.



H. K. PORTER COMPANY, INC.
QUAKER RUBBER DIVISION
Philadelphia 24, Pa.
QUAKER PIONEER RUBBER DIVISION
San Francisco 7, California

When inquiring check CP 3774 opposite last page

reach a new peak with YARWAY

cone spray

Most popular design for cooling, recooling, washing, rinsing, air conditioning, drying and other spraying operations in industrial and processing work and in power plants.

Non-clog involute design has no internal parts (vanes or deflecting plates) on which foreign particles can collect. Special contour of nozzle body guides flow with minimum loss of energy towards discharge opening, where liquid attains maximum velocity and leaves nozzle in a fine hollow-cone spray.

Available in three types:

Bar-stock bronze (shown) for fine spray
Sizes $\frac{1}{4}$ " and $\frac{3}{8}$ ", male or female connection
Capacities up to 3 gpm; pressures 20 to 50 psi

Cast bronze Type B (shown) for air conditioning and small recooling systems
Five sizes, $\frac{1}{2}$ " to $1\frac{1}{2}$ "
Capacities up to 40 gpm; pressures 7 to 25 psi

Cast bronze Type C (not shown) for spray pond service
Sizes 2" and $2\frac{1}{2}$ "
Capacities up to 110 gpm; pressures 7 to 15 psi

Write for YARWAY Spray Nozzle Book N-617; it gives capacities, dimensions and application information.

fan spray

Preferred for many washing and cooling operations. Non-clog design, delivers flat fan-shaped sheet of spray with slicing action particularly desirable for surface washing.

Thin sheet of spray is discharged forward 30° from the vertical, spreading in fan shape up to 140°, depending on operating pressure.

Made of bronze, steel or other bar-stock metals, male thread, six sizes $\frac{1}{8}$ " to 1", capacities up to 7 gpm, pressures up to 50 psi.

Write for YARWAY Spray Nozzle Book N-617.

YARNALL-WARING COMPANY
125 Mermaid Avenue, Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY

spray nozzles

When inquiring check CP 3775 opposite last page

in spraying efficiency non-clog nozzles



YARWAY Type B Involute Nozzles



YARWAY Fan Spray Nozzles

SAFETY

Hand grip protects workers' hands, eases pipe handling

Pipe hook's safety handle reduces hazard of crushed hands while moving pipe sections. Device, weighing $6\frac{1}{2}$ lb, can be used manually when placing pipe in position for welding or connecting. Cluster of up to four hooks can be used on a spreader bar for loading or unloading pipe. Hook has a $2\frac{1}{2}$ " throat and a $1\frac{1}{4}$ " eye.



Hook protects workers' hands by providing safe grip

(Safety pipe hook is product of Newman Manufacturing & Sales Co., Dept. CP, P. O. Box 5939, Kansas City 11, Mo. . . or for more information check CP 3776 on form which is located opposite last page.)

Fire-retardant insulating mastic subject of bulletin

Two-page bulletin describes an insulating mastic formulated primarily to serve as a fire and heat-retarding coating for metal structural supports. Coating can also be used for metal vessels and other equipment as well as on wood. In addition to its fire-retardant properties, mastic described serves as excellent protective coating for interiors or exteriors to insulate, rust-proof, and waterproof in a range of minus 20 to 250°F.

Bul on No. 5501 Fire-Retardant Insulating Mastic is issued by Insul-Mastic Corp. of America, Dept. CP, 7750 W. 61st Pl., Summit, Ill. When inquiring about manufacturer's product reader may simply check CP 3777 on form which is located opposite last page.

**don't wait for a
SERIOUS
ACCIDENT**

**Install a
"NECO"
SAFETY
TANK CAR PLATFORM**

Eliminate dangerous hazards of working on slippery tank car tops. Avoid costly, heartbreaking accidents. Protect your employees — make them more efficient.

Custom built vertically adjustable platforms available in a range of prices. Hydraulically or manually operated. Write for pictures, specifications, information.

NICHOLS ENGINEERING CO.
3816 W. GRAND AVE., CHICAGO 51, ILL.
SERVING INDUSTRY SINCE 1894

Model NECO-2A is outfitted with lights, access ladder, incorporates piping.

When inquiring check CP 3778 opposite last page



HAWS EYE-WASH FOUNTAINS

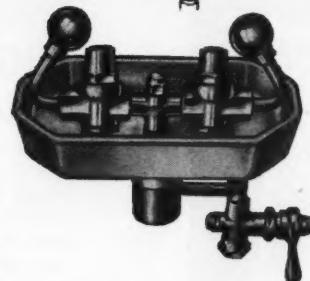
Time elapsing between the accident and arrival of medical aid, is too often a cause of permanent eye injury. Bridge this time gap with a HAWS Emergency Eye-Wash Fountain. Installed at convenient locations, these HAWS safety devices are instantaneously ready when such accidents occur.

The HAWS Eye-Wash Fountain washes injurious chemicals out of the eyes with clean water at controlled pressure and volume. It is also available with Drench Shower Attachment...completing an emergency station for your employees' protection.

WRITE TODAY for brochure and full details

HAWS DRINKING FAUCET CO.
1439 FOURTH STREET (Since 1909) BERKELEY 10, CALIF.

When inquiring check CP 3779 opposite last page



Designed and manufactured
in cooperation with
leading safety engineers

Description: Material is available in 10 lb cans, 25 lb pails and 100, 200, 300 and 500 lb drums. Ton lots are shipped in 100 lb waterproof bags.

(Ice Rem is product of Speco, Inc., Dept. CP, 7308 Associate Ave., Cleveland 9, Ohio. Check CP 3780 opposite last page.)

Explains monitor for vibration

Illustrated data sheet explains operation and advantages of alarm which registers mechanical vibration. Typical applications of unit are included.

Bul 500-4 is issued by The Beta Corporation, Dept. CP, Forest Ave. at Ridge Rd., Box 8625, Richmond 26, Va. Specify CP 3781 opposite last page.

SAFETY

**Bane of ice and snow
harmless to grass . . .**

de-icer pellets contain inhibitor to retard rust, corrosion

Uses: Removing ice from such spots as walks, loading ramps, railway switches, drains, etc.

Features: Pellets contain material to retard rust formation and increase storage life. De-icer is harmless to vegetation, rubber, asphalt and paved surfaces.



De-icer is harmless to vegetation or paved surfaces

Most versatile of all industrial fans



PROPELLAIR TYPE "CD" DIRECT CONNECTED FAN

Use this heavy-duty fan for ventilation . . . to exhaust heat, dust, moisture, fumes and smoke. It's powerful, dependable, efficient. Use it in ductwork, hoods, roof ventilators, wall mountings or for air circulation and cooling. Engineered to move a lot of air at low cost.

You get these important features:

- Cast aluminum airfoil propeller for greater efficiency
- Dependable R & M All-Weather Motor direct connected for long, trouble-free service
- Venturi entrance ring with tip seal to create efficient air flow
- Rugged steel motor support arms welded to entrance ring
- Explosion-proof and glass-insulated motors available
- Fan and motor covered by a single Robbins & Myers guarantee

Write for Bulletin 690-C



R & M PROPELLAIR
DIVISION OF ROBBINS & MYERS INC.
SPRINGFIELD - OHIO



When inquiring check CP 3782 opposite last page

Now! The Right Glove For Your Job



Let PIONEER's
"Hand
Protection
Clinic"
Help!

Send (Attn: Hand Protection Clinic) a job description, including the answers to these questions, on your company stationery and we'll solve your glove problem for you. Assures you of maximum worker protection and comfort at the minimum cost.

1. Are gloves to protect the worker or the product?
2. How far up arm is protection required?
3. How much dexterity is required?
4. How much abrasion resistance is required?
5. What chemicals (i.e., solvents, etc.) are used?
6. Are extreme temperatures encountered?

Complete Glove Catalog
available on request!



the PIONEER Rubber Company

241 Tiffin Road, Willard, Ohio, U.S.A.

Pioneers in Industrial Hand Protection For Over 35 Years

When inquiring check CP 3783 opposite last page

SAFETY

Choose a safety target
with "Accident Facts"

Statistical yearbook is now available in 1955 edition. Its 96 pages review facts and statistics of traffic, home, farm, and school accidents as well as industrial records. Twenty pages of the book are devoted to occupational accidents. These provide basis for setting industrial safety targets.

To obtain "Accident Facts" remit \$75 direct to National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill.

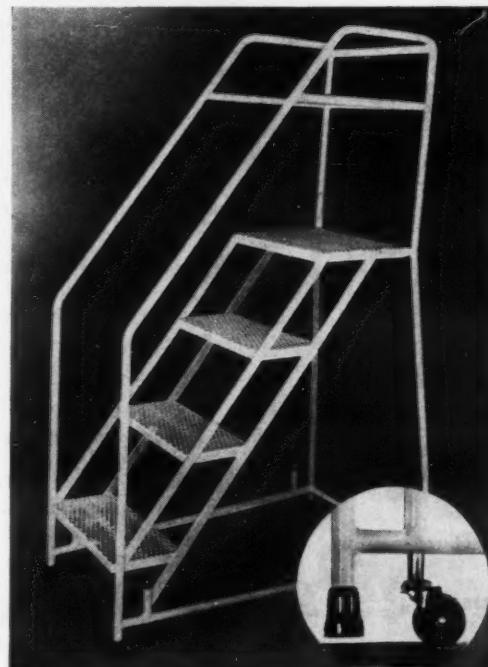
**Eliminates rolling or tilting —
moves on swivel casters . . .**

ladders are available with either perforated or expanded metal steps

Uses: A ladder that anyone in the plant can use safely.

Features: Ladder rolls on four swivel casters, which retract automatically when user's weight is put on the first step. Four rubber-tipped feet engage the floor as casters retract, eliminating slipping, rolling, shifting, and tilting.

Description: Ladders are flared 3" out each side and 4" out the rear to assure stability. Top step on each model is 12" deep. Higher ladders are equipped with hand rails.



Ladders are constructed of $\frac{7}{8}$ " steel pipe and are available with perforated or expanded metal steps

Sounds for Safety

engineered by
FALCON



New Falcon Automatic Fire Detectors and Alarms provide constant protection wherever fire is a hazard. Self-powered by DuPont "Freon", they give early warning at first sign of fire. U. L. Approved for 20 Ft. Spacing — Low Cost — Non Electric — Easy Maintenance — Easily Installed — 30 Yr. Guarantee.



Falcon manually operated Emergency Signaling Horns are portable, self-contained and "Freon" powered. Many types and sizes. Special designs for special uses. Write for details —

FALCON ALARM CO. INC.
243 BROAD STREET
SUMMIT, NEW JERSEY

When inquiring check CP 3784 opposite last page



Specify

ACME

**...the Gas Mask that gives you
MAXIMUM USABLE VISION**

Vision-scope tests made with leading industrial gas masks prove that ACME Full-Vision gas masks lead the field in giving you clear, undistorted vision — up, down and to either side. Along with maximum usable vision, you get greater comfort, less fogging, minimum breathing resistance and acceptable conversation transmission — all, at down-to-earth prices.

Write for Bulletin No. 562 on Vision-scope Tests and Bulletin No. 501 describing ACME gas masks.

ACME PROTECTION EQUIPMENT CO.

1219 Kalamazoo St., South Haven, Michigan

When inquiring check CP 3785 opposite last page

SAFETY

Two types of step construction are available: perforated sheet metal or small diamond expanded metal, reinforced beneath with steel bars. Ladders are constructed of $\frac{7}{8}$ " OD steel pipe and are finished in one of four colors — aluminum, gray, safety yellow, or green. Ladders are available with from one to seven steps and in three standard widths, 18, 26, and 32".

(Safety step ladders are produced by Tri-Metal Co., Dept. CP, Box 93, Berwyn, Pa. . . or for more information check CP 3787 opp. last page.)

**Treated with mildew repellent —
1" hose weighs 14 lb
per 100 feet**

Uses: For in-plant or other industrial fire protection. Hose is also useful for portable or temporary water lines.

Features: Generally lighter and more compact than conventional fire hoses, 100 feet of $1\frac{1}{2}$ " diam hose makes a coil less than 18" diam. Actual weights for 100 foot length: 1"-14 lb, $1\frac{1}{2}$ "-20 lb, $2\frac{1}{2}$ "-41 lb.

for washing,
cooling, processing,
humidifying, dehydrating,
and hundreds of other applications.

You'll get the right nozzles
quicker by calling Binks...
manufacturers of one of the
most complete selections ever
produced.

There is a size and spray
pattern for every purpose...
with nozzles cast or machined
from standard or special
corrosion-resistant metals and
materials.

**MAIL COUPON
NOW!**



Binks Manufacturing Company
3120-32 Carroll Ave.,
Chicago 12, Ill.

O. K. Binks, send me your comprehensive
Spray Nozzle Catalog without obligation.

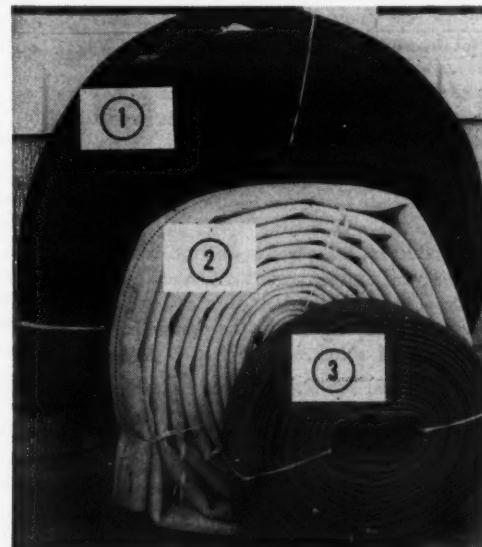
NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____
607

Binks

A COMPLETE LINE OF
INDUSTRIAL SPRAY NOZZLES
AND COOLING TOWERS

When inquiring check CP 3786
opposite last page

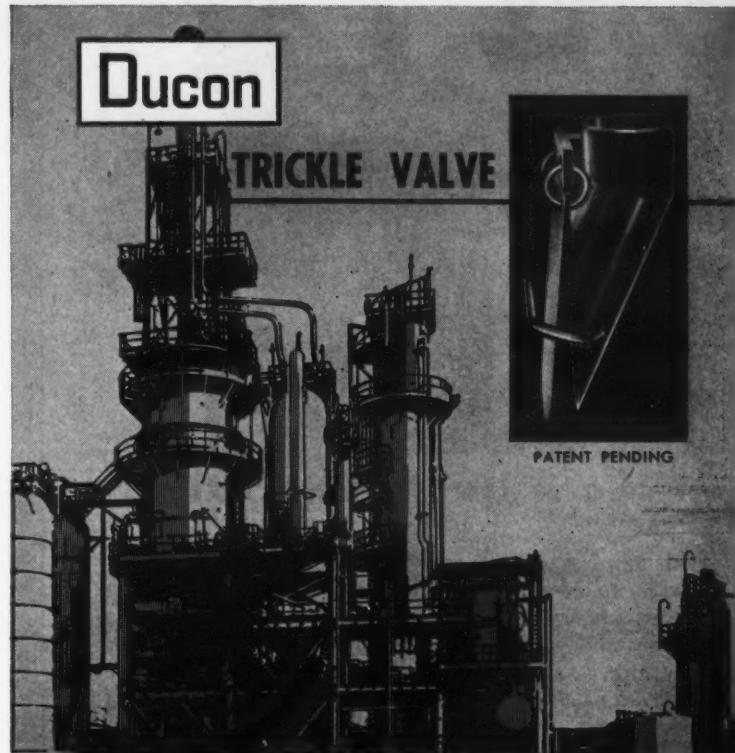
FEBRUARY, 1956



Hose is lighter and more compact than conventional fire-fighting hose

Description: Rated burst pressure for 1" hose is 1000 psi, for $1\frac{1}{2}$ " hose is 700 psi. Outer surface of the hose jacket is impregnated with a neoprene water repellent and is processed with a mildew deterrent.

(Lite-Flex X-88 Hose is produced by Goodall Rubber Co., Dept. CP, 3550 W. 12th St., Houston, Texas. Check CP 3788 opposite last page.)



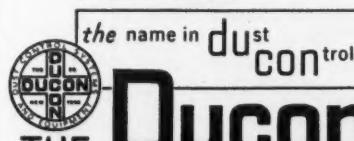
**... the first dip-leg SEAL with
approval for fluid catalytic cracking plants**

Ducon's trickle valve has been approved throughout the refining industry, as a "fool-proof" dip-leg seal. Here is the result of years of specialized experience . . . the kind that pioneers progress . . . the kind that has earned for Ducon recognition as a leader in the field of catalyst and fluid solids recovery.

Over 500 trickle valves already in service are proving the effectiveness of the following features:

**COMPLETELY AUTOMATIC DIP-LEG SEAL
MINIMUM CATALYST LOSS AT START-UP
ASSURANCE OF DIP-LEG SEAL DURING UPSET
ELIMINATES ALL ADDITIONAL AERATION
MAINTENANCE-FREE CONTINUOUS OPERATION**

Write for Bulletin



THE Ducon COMPANY

147 EAST SECOND STREET, MINEOLA, N.Y. • Sales Representatives in Principal Cities

Canadian Branch: THE DUCON COMPANY of CANADA, Ltd.
275 James Street North, HAMILTON, ONTARIO

Designers and Manufacturers of Dust Control Equipment Exclusively
CYCLONES • CENTRIFUGAL WASH COLLECTORS • TUBULAR CLOTH FILTERS • DUST VALVES

When inquiring check CP 3789 opposite last page



of both liquid and solids

This new Niagara "Batch Miser" Horizontal Plate Filter *leaves no heel* at the end of the cycle. Slurry flows under pressure directly to the individual plates from a *central manifold* . . . then through the filter medium or filteraid . . . and into the tank. With other designs there is always heel left in the tank unless a scavenger leaf is employed.

No tie rods . . . less down-time Plates fit snugly together at the rims and are held tightly in this position by a pressure ring. Integral with the cover, the pressure ring bears on the rim of the top plate. As the cover is tightened, pressure is exerted on the plate assembly *equally* around its perimeter. This simple construction prevents leakage and eliminates possibility of warping the plates. Plates can be removed from the tank singly or in a bundle and are easily slipped off the central manifold for quick cake removal. Send for complete data.

***** MAIL COUPON TODAY *****

Niagara FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CP-256, EAST MOLINE, ILLINOIS

- Send Bulletin with complete data on the new Niagara "Batch Miser" Horizontal Plate Filter for handling.
- Have representative call.

NAME & TITLE

COMPANY

ADDRESS

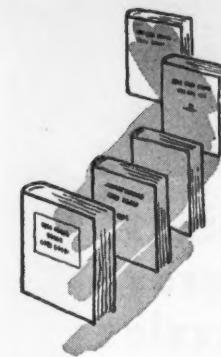
CITY

ZONE STATE

Specialists in Liquid-Solids Separation

When inquiring check CP 3790 opposite last page

Recent Books



Conduction Heat Transfer

Reviewed by RICHARD P. BOBCO
Instructor in Mechanical Engineering
Colorado School of Mines

P. J. Schneider has made a valuable contribution to the well-cataloged study of heat conduction. Although primarily intended as a graduate text, the 395-page book is so well written that it can also serve as a reference for private study. Schneider's scope is broad and he deals with a number of problems never before included in a textbook. The reader need have no more than a basic knowledge of calculus and differential equations.

The text systematically and explicitly develops the use of Bessel functions, Legendre polynomials and Fourier series in addition to product and Leplace transform solutions to the well known partial differential equations of heat conduction. Virtually all cases are carried through from the basic equation to the final solution.

Such classical subjects as infinite planes and cylinders, spheres, fins and spines, moving heat sources, are discussed. However, in addition to these familiar configurations, Schneider covers more recent developments. These include conduction cooling of gas turbine blades, temperature fields in nuclear reactors and accelerating supersonic wings, and the phenomenon of porous or sweat cooling.

Since not all configurations lend themselves to analytical solutions, there is a thorough discussion of numerical and graphical techniques. Relaxation methods for steady and transient systems as well as those having internal heat sources are described. Graphical methods are also described for steady two-dimensional systems and transient one-dimensional systems — with emphasis upon

the methods of Lutz and Binder-Schmidt. The author includes a splendid chapter on experimental procedures. He discusses the relatively recent technique of the membrane analogy (as applied to heat conduction) as well as the several types of electrical analogues.

There are numerous problems at the end of each quantitative chapter and a great many numerical examples solved in the body of the text. The bibliography while not complete is extensive enough to help anyone searching the literature. The table of conduction properties could also have been made more complete, but any that are not included can certainly be found elsewhere. All things considered, the value of this text lies in the author's clear literary style and his generous use of illustrations and comparative performance charts. The reader is never left to ponder the location of a dimension or wonder about the performance of a given configuration under different conditions. Schneider's discussions are neither sketchy nor pompous and what he means is rarely open to question.

To obtain "Conduction Heat Transfer" remit \$10.00 direct to Addison-Wesley Publishing Co., Inc., Dept. CP, Cambridge 42, Mass. When inquiring specify CP 3791 on form opposite last page.

Review of Current Research, 1955

(Staff Review)

Designed primarily as a guide, "Review of Current Research, 1955", should be of interest to many people and should help sponsors evaluate the research capabilities of institutions where they wish to place their research.

Published by the Engineering College Re-

**reviews of current technical and reference works
... summarized for you by authorities in the field
working with the CP staff**

search Council of the American Society for Engineering Education, the 352-page book reports on approximately 7500 research projects being carried on at 105 member institutions of the council. Research expenditures amount to about \$75 million annually.

Approximately 5000 entries of research project subjects are listed in the index. Institutions are also listed alphabetically in the book and these include all major engineering schools in the US. Information given for each institution includes: names of responsible administrative officers, policies which govern research projects and contracts, annual expenditures for research projects, sources of income for research, and special conferences and short courses of interest to research workers.

Fields of research listed include all branches of engineering and most related fields. No attempt has been made to separate basic from applied research and development. Book points out that this is partly due to the fact that current definitions are not satisfactory. Furthermore, on many projects it is possible to find combinations of all three, and it is difficult to draw a line as to where one begins and the other leaves off.

To obtain "Review of Current Research, 1955" remit \$2 direct to Secretary, Engineering College Research Council, New York University, Dept. CP, University Heights, New York 53, N. Y. When inquiring specify CP 3792 on form opposite last page.

Vapor-Plating (Staff Review)

The designation "vapor-plating" is applied to both physical and chemical means of depositing one metal on the surface of another. Powell, Campbell, and Gonser

confine themselves to the chemical processes of thermal decomposition and hydrogen reduction in "Vapor-Plating," a 158-page authoritative survey of the vapor deposition of metals and nonmetals.

Proceeding from an introductory chapter that deals with historical aspects, photo-micrographs, and general considerations, the authors cover the subject completely in chapters devoted to metals, carbides, nitrides, boron and borides, silicon and silicides, and oxides. Text matter is nicely supplemented with tables of properties, several equations, and a few line cuts. The book, which is greatly strengthened by the inclusion of 400 references to the literature and by adequate author and subject indexes, is as far as we know, the only self-contained source of data and techniques that pertain to the chemical processes of vapor-plating.

To obtain "Vapor-Plating" remit \$5.50 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify CP 3793 on form opposite last page.

Methods of Quantitative Micro-Analysis

*Reviewed by DANA S. DAVIS
Miami University
Oxford, Ohio*

This systematic, expository volume of 742 pages, compiled and edited by R. F. Milton and W. A. Waters, is a successful work, presenting the most modern of established routine micro-analytical procedures, and giving accounts of the newest micro-analytical research apparatus. A revision and extension of the first edition, published in 1949, this second edition includes a new section on chromatographic analysis, a
(Please turn to next page)



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When inquiring check CP 3795 opposite last page

Recent Books

(Continued from preceding page)

broader discussion of sources of error, and a larger collection of tables summarizing comparable procedures. In this volume, too, is a section treating various micro-biological techniques.

The text is divided into eight parts. Each part is composed of orderly grouped sub-topics. The parts are, from One to Eight: I. Gravimetric Apparatus and General Micro-chemical Techniques; II. Micro-analysis of Organic Compounds; III. Volumetric Analysis; IV. Colorimetric Analysis; V. Electro-chemical Methods of Micro-analysis; VI. Gasometric Methods of Micro-analysis; VII. Chromatographic Analysis; VIII. Biological Methods of Micro-analysis.

Preceding each of the parts is a detailed table of contents simplifying the task of reference. The typography and footnoting are excellent. Two very good features are the author and subject indexes.

Contributors include: A. J. Amos, G. Ingram, S. M. Partridge, J. T. Stock, T. Swain, and K. M. Wilson.

The volume is not intended as a lab manual by itself. It is, rather, to supplement for the analyst, well-trained in general chemistry and familiar with ordinary "macro" methods, the standard procedures of micro-analysis.

To obtain "Methods of Quantitative Micro-Analysis" remit \$15 direct to St. Martin's Press Inc., Dept. CP, 103 Park Ave., New York 17, N. Y. When inquiring specify CP 3796 on form opposite last page.

Cellulose Nitrate

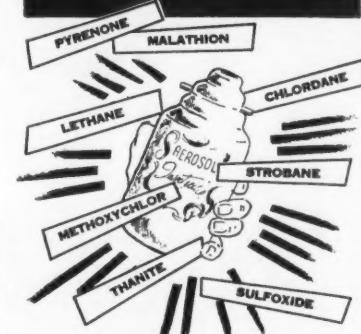
Reviewed by EDGARD G. SIMPSON

Dublin, Virginia

This 422-page monograph by Dr. Frank Douglas Miles is a survey of the principles that underlie manufacture and use of nitro-cellulose. Book is written from the viewpoint of a physical chemist, theoretical physical chemistry is dealt with in detail, but the author continually keeps in mind the technical needs and practical aspects of the subject.

Text is divided into three parts. Part I includes an excellent survey of the chemical constitution and physical structure of cellulose, and a detailed study of the process of nitration and associated absorption proc-

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CHEMICAL PROCESSING

Recent Books

esses. Part II covers the physical properties and gelatinization of nitrocellulose, with types of gels and their application to the fields of explosives and plastics. Part III deals with chemical reactions and solutions, including decomposition and the physical properties of various concentrations of nitrocellulose solutions.

Throughout the book the author first develops the fundamental chemistry and then proceeds to describe briefly the methods by which the products are made. These are not detailed or working descriptions, but are used to add to the understanding of the fundamental theory.

The literature of the subject is fully discussed, and the author has used previously unpublished results of researches made available to him by the Nobel Laboratories of I.C.I.

Book is well-illustrated with graphs and diagrams. It should be of great value to both research and industrial workers in the explosive and plastics fields.

To obtain "Cellulose Nitrate" remit \$7 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Ave., New York 1, N. Y. When inquiring specify CP 3798 on form opposite last page.

Encyclopedia of Chemical Technology

Volume XIV
(Staff Review)

The fourteenth volume of this outstanding reference series covers the field of chemical technology from "thermodynamics" to "waterproofing." The 980-page volume includes detailed discussions on thermodynamics; thio compounds; thorium and compounds; tin alloys, and compounds; tints, hair dyes and bleaches; titanium, its alloys and compounds; trade-marks; thiazole, vat, and triphenylmethane dyes; ultrasonics; uranium and compounds; urethans; vacuum technique; valence; vapor-liquid equilibria; vinyl compounds; vitamins; industrial wastes; and water.

To obtain "Encyclopedia of Chemical Technology, Vol. 14" remit \$25.00 (for series subscribers, \$30.00 for single copies) to Interscience Publishers, Inc., Dept. CP, 250 Fifth Ave., New York 1, N.Y. When inquiring specify CP 3799 on form opposite last page.

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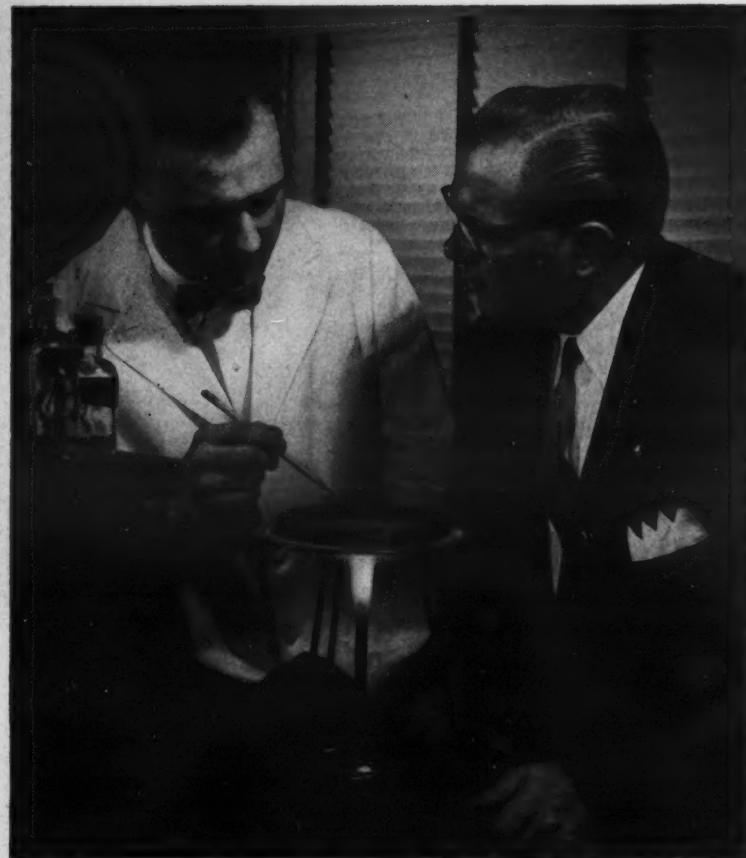
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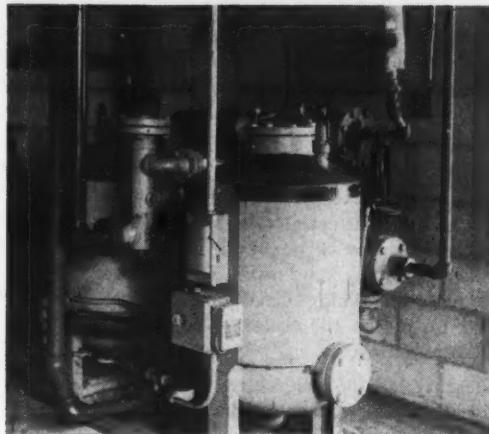
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engineering and maintenance

With more than a million gallons of hygroscopic solvents in storage, Lehigh

Warehouse dries tank air and . . .



CP Staff Photo

Two dryer towers handle entire tank farm. While one tower is adsorbing, the other is being reactivated

beats humidity problems

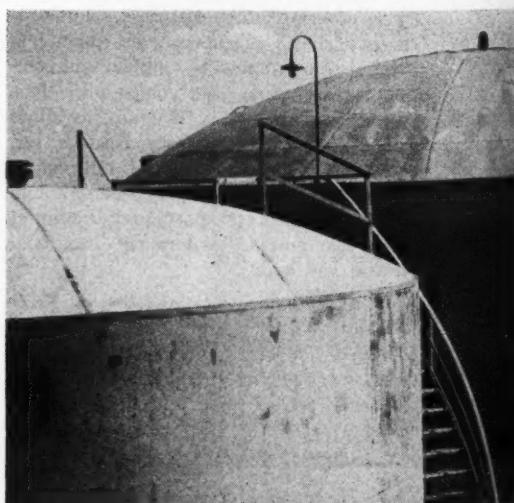
Single air dryer keeps chemicals from picking up moisture during storage, maintains quality standards

By WILLIAM C. CLARKE, Assistant Editor
with PHILIP DE FEO, Superintendent
Lehigh Warehouse & Transportation Company
Bayonne, New Jersey

Problem: Industrial solvents had to be shipped to customer from terminal point of Lehigh Warehouse & Transportation Company in at least as good condition as received from solvent-manufacturing plant. If possible, quality of the industrial solvents — propylene glycol, perchloroethylene, ethylene glycol, methylene chloride, carbon tetrachloride, chloroform — had to be improved. Many of the solvents are hygroscopic. Moisture can easily be picked up during pumping from tank ship to storage and during storage. Percent moisture of solvents had to remain at least constant according to specifications of solvent manufacturer . . . The Dow Chemical Company.

Solution: Engineers installed a dual tower air dryer to remove moisture from air-blanket over solvents in tank farm storage. Adsorber towers are filled with activated alumina which picks up mois-

ture from air at a working pressure range of 35 to 150 psig at normal temperatures. Being a dual tower unit, drying process continues without interruption since, while one tower is on adsorption duty, the other is being reactivated and cooled.



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Drying cycle consists of passing moisture-laden air through adsorber towers. After adsorbent has become saturated, water is driven off by passing a stream of heated air through the dryer. The activated alumina is then cooled to about room temperature and is then ready for another drying cycle. Alternate picking up of moisture and then drying by the alumina and then its reactivation by heated air can be continued almost indefinitely under proper conditions without great deterioration.

Operating cycle is timed for three hour adsorption period and a three hour reactivation and cooling period. While the process air is flowing through one tower and being dried, another air stream is being heated and passed through the other tower. Moisture-laden exhaust is passed through a cooler where the moisture is condensed. This air stream then goes to a separator for moisture-trapping.

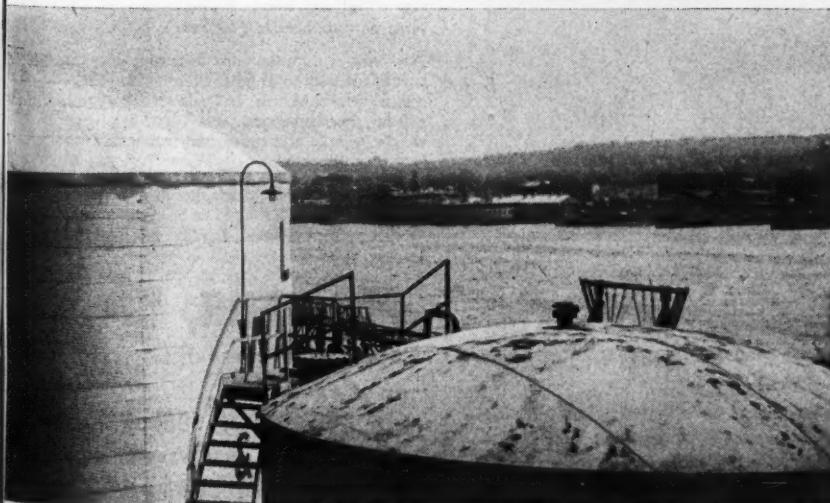
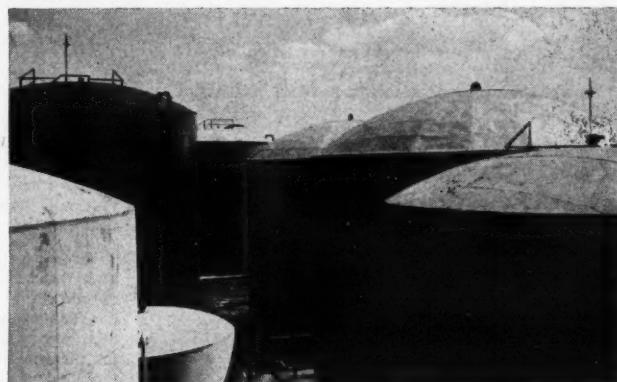
Some of the tanks protected by the one dryer installation
CP Staff Photo

Since tanks are on New York Bay, high atmosphere humidity must be overcome by dryer
CP Staff Photo

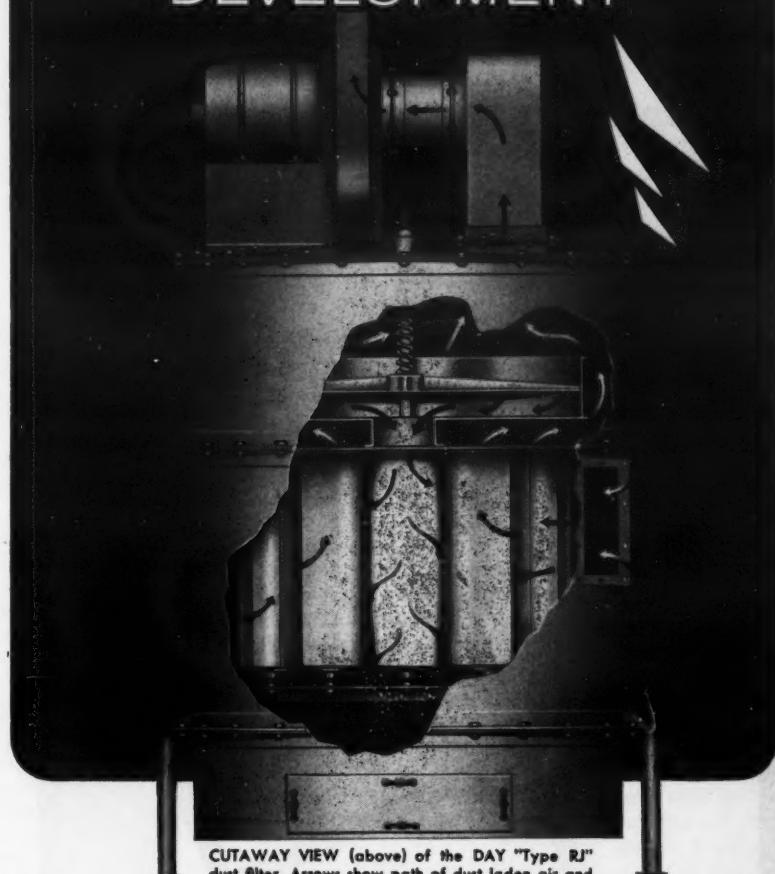
Air is then returned to process air stream. Air dryer is automatic in operation. After moisture has been removed from reactivation exhaust, heater shuts off although the reactivating air continues to flow and cool the adsorber bed. At the end of three hours flow cycle is alternated. Flow through adsorber towers is reversed.

Lehigh Warehouse and Storage Company receives industrial solvents from The Dow Chemical Company by tank ship. Solvents are pumped into storage tanks against positive air pressure for storage until the liquids can be shipped to customers by tank car, tank truck, or 55-gal drums. The solvents are moisture-sampled on board ship, during discharge from the tanker, during storage, and during packing for shipment to customer. Rigid specifications require customer shipments be as good quality or better than when received by tank ship.

(Please turn to next page)



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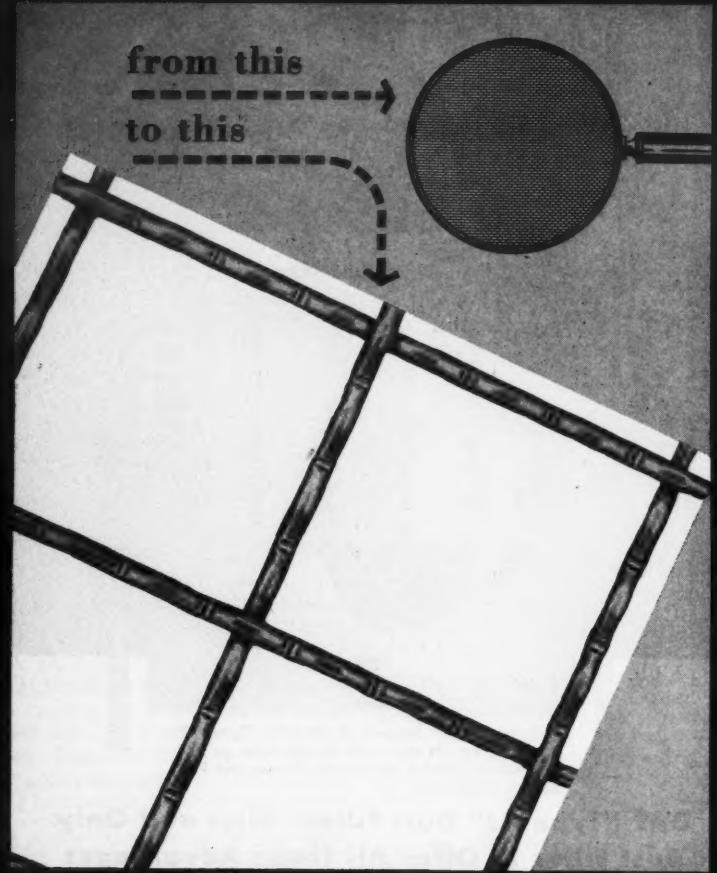
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(Continued from preceding page)

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(Proctor power exhauster is a product of Proctor and Schwartz, Inc., Dept. CP, Seventh St. and Tabor Rd., Philadelphia 20, Pa. . . or for more information check CP 3805 on form opposite last page.)



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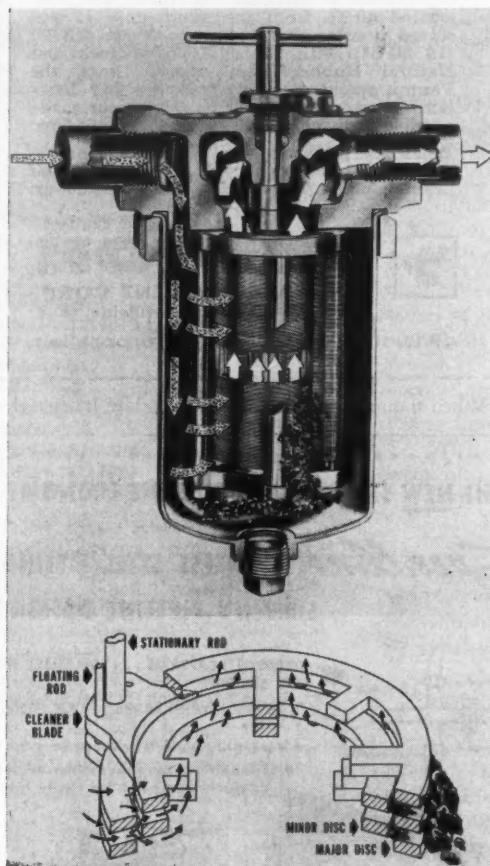
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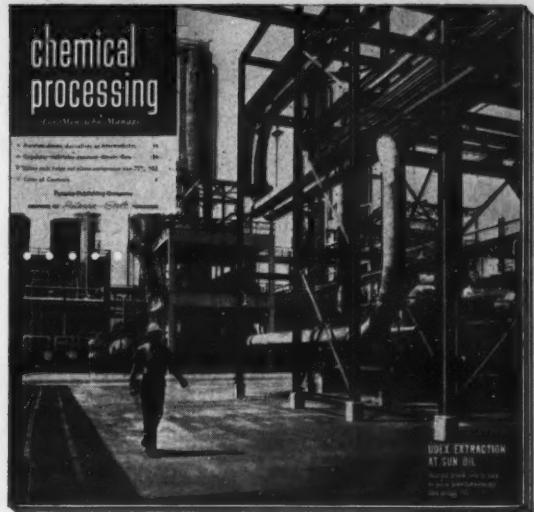
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gives up to 2000 readings

It's this simple: Select the Tempilstik® for the working temperature you want. Mark your workpiece with it. When the Tempilstik® mark melts, the specified temperature has been reached.

Available in these temperatures (°F)

113	263	400	950	1500
125	275	450	1000	1550
138	288	500	1050	1600
150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000

FREE "Tempilstik® Basic Guide to Ferrous Metallurgy" by 21" x 16 1/4" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

5608

GORDON
SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors
Thermocouple Supplies • Industrial Furnaces & Ovens
Pyrometers & Controls • Metallurgical Testing Machines
603 West 30th Street, Chicago 16, Illinois
2031 Hamilton Avenue, Cleveland 14, Ohio

When inquiring check CP 3814
opposite last page

FEBRUARY, 1956

ENGINEERING & MAINTENANCE

Produces a controlled spray of evenly divided particles from -50° to +250°F . . .

spray head assures even pattern of wetting from center out

Uses: As a spray head in industrial cooling towers, air conditioning cooling towers, spray ponds, and similar installations.

Features: Gives a controlled spray of evenly-divided fluid particles at pressures under 5 psi, and assures an even pattern of wetting from the center out. In cooling towers pattern will efficiently cover width of standard horizontal cooling section without water loss.

On vertical coils, maximum efficiency is gained by use of dual baffle boards. It allows free air circulation around tubes, and totally eliminates blanketing and dampening effects. Streamlined shape of revolving rotor minimizes any tendency for foreign matter to hold on to its surface.

Description: Called Gyrospray, spray head has rotor molded from nylon, is not affected by chemical action of any inhibitors used in industrial cooling water. The large, unique bearing has been specially developed to assure long friction-free life. Unit operates from -50° to 250°F.

(Spray head is a product of N.C. Stearns Co., Dept. CP, PO Box 1234, Shreveport, La. . . . or for more information check CP 3815 opposite last page.)

Offer custom produced parts in wide range of natural or synthetic rubbers . . .

supplied for any standard or special requirement, operating condition, or service demand

Uses: Service where qualities of natural or synthetic rubber are desirable and standard parts are not available.

Features: Parts are custom-produced, to specifications, in a wide range of rubber compounds, either natural or synthetic. They are supplied for any standard or special requirements, operating condition, or service demand.

Description: Compounding of ingredients and proportion is determined by study of end use. Tests are made for gravity, compression set, durability, scorch, elongation and shrinkage, hardness, tensile strength, and modulus. Typical parts include oil seals, O-rings, gaskets, regulator diaphragms, and rubber covered rolls and idlers.

(Molded rubber parts are products of Quality Rubber and Transmission Co., Dept. CP, 2203 W. Chicago Ave., Chicago 22, Ill. . . . or for more information check CP 3816 on form opposite last page.)

ONE OF THE GARLOCK 2,000

SERVICE
REPORTS
ON THIS
PACKING EVEN
SURPRISED US!



Typical Service Reports
on Lattice Braid Asbestos
Packing with Teflon:

- Outlasted another Garlock Style 10 to 1 against blending waxes and steam for cleaning.
- Outlasted competitor's packing 38 to 1 against caustic at 325°F., 50 psi.
- Outlasted other packings 3 to 1 against cold water.



Don't take our word for the greater strength, longer life of LATTICE BRAID with Teflon—try an initial order of 10 or more feet today. The Teflon core and impregnation resist everything except molten alkali metals and some freons.

And, remember, LATTICE BRAID with Teflon is only one of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals to meet every conceivable need. It's the only complete line available.

It's one reason why you can expect unbiased recommendations from your Garlock representative. Call him, or write for booklet 131.

THE GARLOCK PACKING COMPANY,
Palmyra, New York

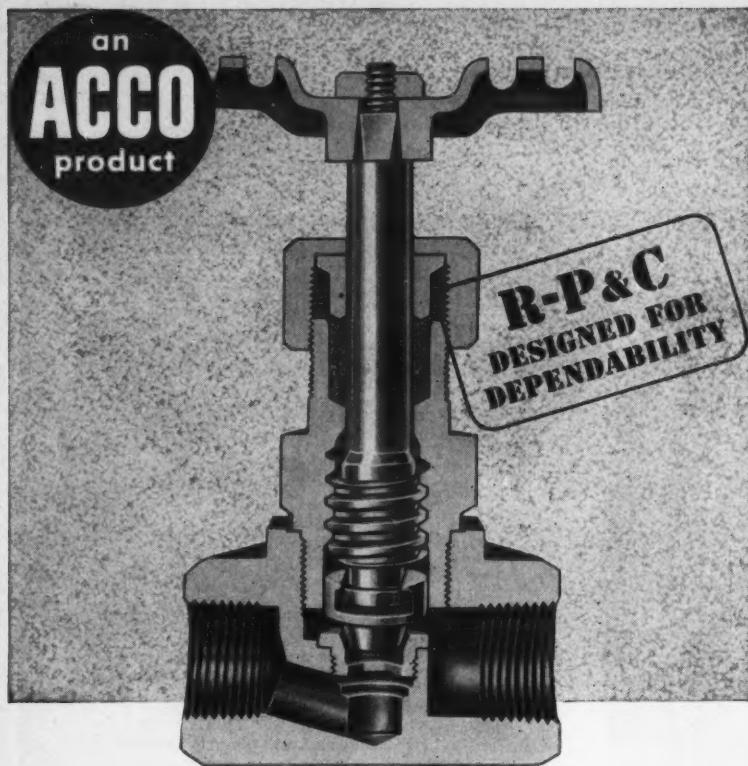
For Prompt Service, contact one of the 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals,
Rubber Expansion Joints



When inquiring check CP 3817 opposite last page



R-P&C Bar Stock Valves

• RATED FOR 10,000 PSI

• FOR CLOSE CONTROL, HIGH TEMPERATURES OR PRESSURES

These rugged bar stock valves were originally developed by R-P&C for close control or instrument use. However, their versatility has proven itself in so many different applications that they are now considered general purpose valves. They are particularly applicable for services involving throttling, or high temperatures and pressures, and are especially adapted for use in crowded applications such as panel boards.

Rated for 10,000 psi at 150°F., each carbon steel bar stock valve is individually tested at 15,000 psi before leaving the factory. They are supplied in sizes from $\frac{1}{8}$ to 1", in globe and angle styles with female ends, male and female ends, or male union ends. They can be furnished in 12-14 chromium stainless steel and 18-8 molybdenum stainless steel for corrosive applications. May also be supplied with special stellite discs for extra abrasion resistance in extremely severe throttling services. Those other than carbon steel are rated at 4,000 psi at 150°F.

R-P&C's complete selection of bar stock valves is only one element in a complete valve line which includes gate, globe, angle and check valves in a wide range of sizes and styles, in bronze, iron and cast and forged steel. See your R-P&C Distributor or write for catalog.



17 x 22" wall chart gives installation and operation pointers. Tells how to protect valves, prolong life. Write for your copy.

ACCO

R-P&C Valve Division
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

When inquiring check CP 3818 opposite last page

R-P&C
valves

ENGINEERING

Trial by fire proves worth of silicone insulation to Davison Chemical . . .

crane motor temperatures frequently hit 305°F

Motors on cranes handling superphosphate at Davison Chemical Co., Div. of W. R. Grace and Co., Baltimore, Md., were subjected to continuous, 24-hr duty. In 1947 winding of rotor on one motor was protected with silicone insulation. When stator of motor later caught fire examination showed that only some of the top sticks in rotor



One of five overhead cranes handling superphosphate at Davison Chemical

were charred. It was returned to service in a different stator after being dipped again in silicone varnish. Stator had to be completely rebuilt.

Davison then converted six of their AC crane motors to complete silicon insulation of rotor and stator. Units now operate continuously in ambient temperatures ranging around 100°F and in some cases thermocouples in motor frequently show actual temperatures as high as 305°F. One of the motors, rewound in 1948, has been in continuous service since that time without faltering.

(Silicone insulation for motor windings is a product of Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. . . . or for more information check CP 3819 opp. last page.)



Without Adjustments

Peak Performance

Faster Warm Up

Universal Pressure

Reduced Wear

Low Inventory

0 to 250 lbs.

Just Order by Pipe Size (1/2" thru 2")

GREATER CAPACITY

Write for Bulletin 800C.

"WHERE Good Connections COUNT"®

PERFECTING SERVICE COMPANY,

334 Atando Ave. Charlotte, N. C.

Baltimore — Camden, N. J. — Chicago — Cleveland — Los Angeles — New York — Providence — Montreal — Toronto

When inquiring check CP 3820 opposite last page

**NEW
BLASTING
GRIT**

BLACK BEAUTY

**Hard Jobs
Made Easy With**

BLACK BEAUTY BLAST GRIT

(Replaces Old Sandblast Methods)

- Gives a clean surface to resist chemical corrosion
- Different grades for any degree of etching
- No silicosis hazard
- Faster cutting
- Long-lasting—economical
- Impervious to moisture
- Clean, hard, angular grit

Free — 400 LB. WORKING SAMPLE!

Write today for envelope samples and detailed product literature to help you determine the specific grade you require.

Manufactured and Distributed By

H. B. REED & COMPANY INC.

6618-B Kennedy Ave., Hammond, Ind.
H. B. REED CORPORATION
91-B Passaic St., Passaic, N.J.

When inquiring check CP 3821 opposite last page

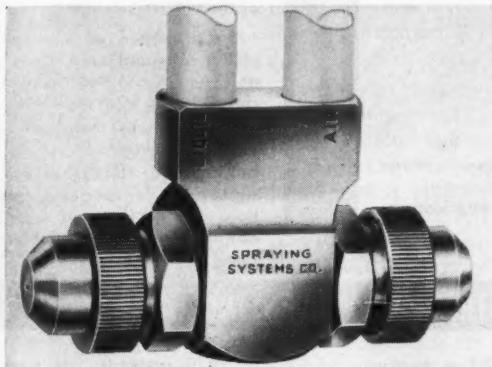
CHEMICAL PROCESSING

**Dual spray atomizing nozzle
features air and liquid
inlets side-by-side . . .**

unit, available in brass or stainless steel, simplifies, reduces cost of installation

Uses: Pneumatic atomizing of liquids in opposite directions at same time.

Features: Pneumatic atomizing unit has two nozzles set to spray in opposite directions, fed by air and liquid inlets positioned side-by-side on top of unit.



Compact design of dual atomizing nozzle simplifies installation

Description: Nozzles come in brass or stainless steel. Inlet design simplifies and reduces cost of installation. Supplied in full range of capacities, unit is available with standard siphon or pressure setups.

($\frac{1}{8}$ -2 JAC pneumatic atomizing nozzle is a product of Spraying Systems Co., Dept. CP, 3216 Randolph St., Bellwood, Ill. . . or for more information check CP 3822 on convenient form opposite last page.)

**Tolerances plus-or-minus 0.0015"
slitting beryllium-copper
sheets in 0.004" range**

Metal strip of all types can now be slit to exacting tolerances. For example, beryllium copper sheet, in thickness range from 0.004" to 0.032", can be slit to tolerances plus-or-minus 0.0015". Slitting process is finding wide application in precision manufacturing processes in the electronics and instrumentation industries.

(Metal slitting process was developed by American Silver Co., Dept. CP, 36-07 Prince St., Flushing 54, N.Y. . . or for more information check CP 3823 on convenient form which is located opposite last page.)



**The Answer To a Tough Problem —
They Bought LaBours**

Handling resins and fatty acids at temperatures up to 520°F calls for pumps with real ability to stand up under punishment. That's why this picture from the Bay Minette, Alabama, plant of Newport Industries, Inc., shows six LaLabour pumps.

These pumps have steam jacketed heads and water cooled seals and bearing brackets. The great advantage of having LaBours: you know they can be depended on for long trouble-free service. As this is

written these pumps have been on the job nearly two years.

Cost-conscious buyers know the real measure of pump economy is not the original price, but the service rendered per dollar of total cost for the life of the equipment. Because LaLabour pumps minimize down-time and repair expense they welcome this realistic comparison. We'll be glad to supply some interesting facts at your request.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LA BOUR

THE LABOUR COMPANY, INC. • Elkhart, Indiana, U.S.A.



When inquiring check CP 3824 opposite last page



Glass-clear transparency, flexibility and resistance to corrosion make Tygon Tubing the ideal piping medium for a wide range of applications . . . handling fluids, semi-solids, gases, vacuums or pressures.

Where pressure is a factor, outer braid reinforced Tygon Tubing will handle up to 300 psi. Heavy walled Tygon will handle full vacuums.

Tygon Tubing is resistant to acids, alkalies, oils, water and alcohol. It is non-toxic, non-contaminating, will handle foods, drugs and other high purity products. Standard sizes range from $\frac{1}{8}$ " i.d. to 2" i.d.

Plastics and Synthetics Division
U. S. STONEWARE
AKRON 9, OHIO

When inquiring check CP 3825 opposite last page



JOSAM SHOCK ABSORBERS
The pounding, shaking noise you hear in your pipe lines is "Water Hammer"—as destructive as it is noisy—loosening fittings, damaging valves and appliances, and causing expensive repairs!

JOSAM SHOCK ABSORBERS easily, inexpensively and permanently "cure" hammering and vibration in pipe lines. Send coupon today for latest scientific data.



JOSAM MANUFACTURING CO.
Dept. CP • Michigan City, Indiana

Please send free copy of Manual "S" on WATER HAMMER
Firm _____
By _____ Title _____
Address _____
City _____ Zone _____ State _____

When inquiring check CP 3826 opposite last page

ENGINEERING & MAINTENANCE

Light, compact pump and motor serve as portable unit for transfer applications . . .

capacity is 10 gpm against a 10 foot head at pressures up to 20 psi

Uses: General transfer applications in chemical, pharmaceutical, and other industries.

Features: Overall assembly of close-coupled electric motor and impeller pump weighs approximately 25 lb and has dry suction lift of 15 feet. Neoprene impeller has $\frac{1}{2}$ " inlet and outlet ports designed to accommodate standard piping.

Description: Unit consists of a stainless steel self-priming pump mounted directly on shaft of $\frac{1}{4}$ -hp, 1725-rpm electric motor. Capacity is 10 gpm against



Pump and motor unit weighs approximately 25 lb

a 10 foot head, and it is suitable for use up to 20 psi. Operation is on 115 AC voltage, 60c, single phase.

(Model 4720 motor pump unit is a product of Jabsco Pump Co., Dept. CP, 2031 N. Lincoln St., Burbank, Calif. Check CP 3827 opposite last page.)

Seven steps to repair concrete with mortar described

Two-page, two-color pamphlet uses photographs to illustrate seven-step procedure for repairing concrete floors with non-shrink mortar. Material has iron particles which serve as reinforcement. Actual strength comparisons with other mortars are given.

"Non-shrink repairs to concrete floors" is available from The Master Builders Co., Sub. of American-Marietta Co., Dept. CP, 7016 Euclid Ave., Cleveland 3, Ohio. Specify CP 3828 opp. last page.

NO RODDING NECESSARY!



Full
Specifications
on
Application

STRAHMAN VALVES, INC., 16 HUDSON STREET, NEW YORK 13, U.S.A.

When inquiring check CP 3829 opposite last page

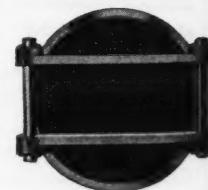
THE NEW LENAPE-LACY quick opening tight sealing MANWAY

Remove one pin—and swing it open! Close—drop the pin in place—it's sealed!

Here is a manway that can be opened in a few seconds—yet can't open accidentally. The Lenape-Lacy design also provides positive sealing which seats more tightly with increasing pressure; and the molded gasket of Hycar or Silicone rubber can be instantly removed and quickly replaced. A lip protects the gasket seat from damage.

Four frame styles are available for all normal mounting conditions in sizes (ID) of 16", 18", 20", 24", and 30" in service ratings of 150 lb., 300 lb., 400 lb., and 500 lb. Also available for pressure-vacuum cycle service.

Write today for Bulletin 523 which describes the Lenape-Lacy Quick Opening Manway in detail.



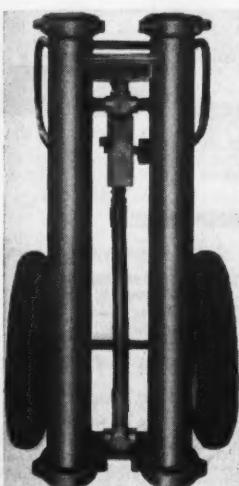
LENAPE
HYDRAULIC PRESSING
AND FORGING CO.

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100
RED MAN PRODUCTS
WEST CHESTER, PA.

When inquiring check CP 3830 opposite last page

**On-the-spot filtration
for hydraulic fluids
with filter buggy . . .**

phenolic resin impregnated cellulose filter provides area of 13,944 sq in



Filter has initial particle selection of 10 microns

(Filter buggy is a product of Schroeder Brothers, Dept. CP, 3116 Penn Ave., Pittsburgh 1, Pa. . . . or for more information check CP 3831 on form opposite last page.)

**Protects equipment, clothing,
electrical systems . . .**

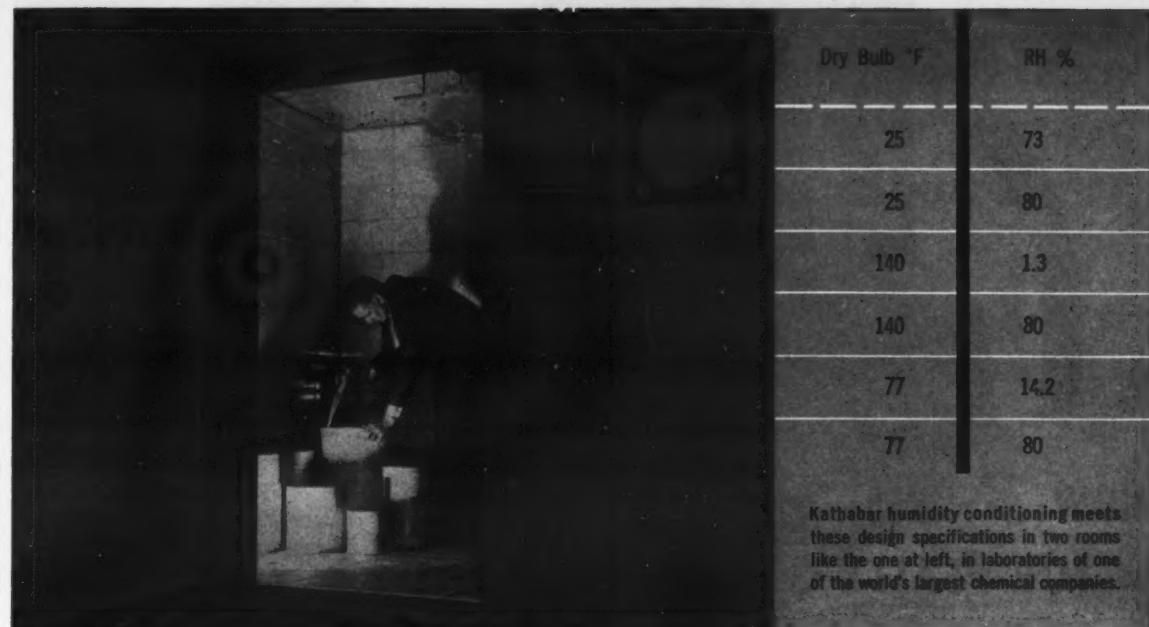
water repellent comes in aerosol package

Uses: For treating natural or synthetic cloth materials, shoes, felt, paper, or wood. Can be used to treat electrical relays and systems exposed to rain or moisture.

Features: Repellent protects against rust and decreases maintenance costs on exposed materials. It's easy and economical to apply. Porous materials are made water repellent and non-porous materials are made waterproof.

Description: Silicone-wax formulation contains a special processed tung oil derivative and is packaged in 12-ounce or two pound disposable aerosol containers. It does not act as a plastic coating, but functions as a protective film against water.

(Water-Skipper is a product of Textile Adjuncts Corp., Dept. CP, 876 Pacific St., Brooklyn 38, N.Y. . . . or for more information about manufacturer's product, reader may simply check CP 3832 on form opposite last page.)



Dry Bulb °F	RH %
25	73
25	80
140	1.3
140	80
77	14.2
77	80

Kathabar humidity conditioning meets these design specifications in two rooms like the one at left, in laboratories of one of the world's largest chemical companies.

control humidity for testing and processing

Whatever atmospheric humidity you need for testing, Kathabar humidity conditioning has the range of control to meet your requirements. For example, a Kathabar system provides RH from 1.3% to 80% at 140°F in this testing room for chemicals and packaging materials. In another lab, the system delivers air at -82°F without frost, *continuously*.

The basis for this tremendous range is the extreme flexibility of the absorbent medium used in the Kathabar system. Dewpoint depression is independent of temperature. This flexibility has been put to work, with either automatic or manual controls, testing and processing basic chemicals, explosives, film, glue and gelatin, petrochemicals, pharmaceuticals, plastics, rubber, shellac, cereals, coffee, and yeast.

In addition to its flexibility and ease of control, Kathabar humidity conditioning is more economical than overcooling and reheating to produce desired RH. Find out how this system can work for you, *in pilot plant or production line*.

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

Have humidity conditioning engineer call. ()

I'd like to know more about Kathabar systems for:

Stopping moisture regain () Testing products ()

Eliminating condensation () Operating below 32°F. ()

Drying at low temperatures () Comfort-conditioning space ()

Desired air conditions: CFM ____; Temperature ____°F; RH ____%.

NAME _____ TITLE _____

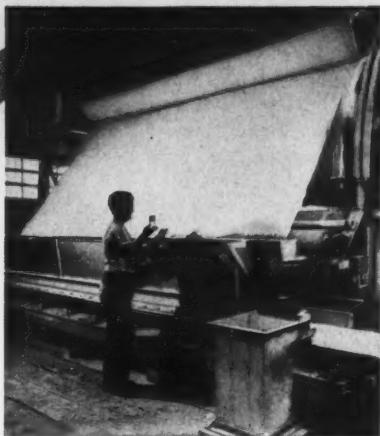
COMPANY _____ PRODUCT _____

ADDRESS _____

Get free help on your humidity control problems



When inquiring check CP 3833 opposite last page



NOW 3 GREAT FEinc FILTERS FOR REALY CONTINUOUS FILTRATION

Easy or tough, your continuous filtration is different. It takes a lot of experience plus careful study of your specific problem to select and design the smoothest running, most economical filter. Filtration Engineers Inc. offers you more than 35 years of this kind of experience . . . backed by proved ability to deliver tailor-made filters at no more than standard costs.

The FEinc String Discharge Filter . . . the original string filter . . . handles all types of cakes . . . even thin soupy slimes. The strings lift the cake from the cloth cleanly, and eliminate common problems of smearing, blinding and blow-back. Cloths last longer, with less down-time for washing or replacements. Often it's the most economical filter for easy jobs as well as tough ones. Special features included submergence washing and compression dewatering.

The new FEinc horizontal filter, simple, trouble-free, is recommended for free-filtering materials such as coarse granules, or fibrous cakes. Counter-current washing is available.

FEinc scraper filters, for standard problems, are quality built, with many special constructions, such as rubber covering, totally enclosed housings, etc. On filter at right, for instance, drum submergence can be varied at will from zero to 30%.

Ask today for full details or analyses . . . no obligation, of course.



Filtration Engineers, Inc.

CUSTOM DESIGNERS AND MANUFACTURERS OF ALL
TYPES OF CONTINUOUS FILTRATION EQUIPMENT

155 ORATON STREET • NEWARK 4, N. J.

When inquiring check CP 3834 opposite last page

FEinc

ENGINEERING

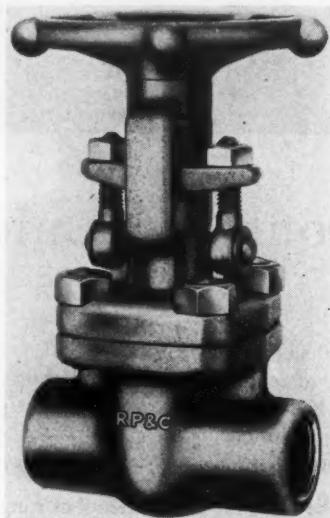
Liberal use of stainless steel adds strength to valve line . . .

rolled stem threads replace cut threads for toughness

Uses: Valves are designed for use in petrochemical, power, and process piping industries.

Features: Liberal use of stainless steel increases strength and wearing qualities.

Description: Parts now fabricated of stainless are: follower, nuts, wedge, and eyebolts. Seat



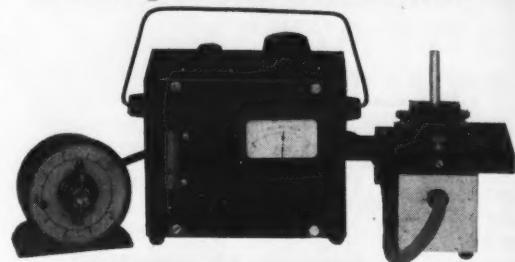
Valve sizes range from $\frac{1}{4}$ to 2" with screwed or welded ends

rings are hard chrome plated. Rolled stem threads have replaced cut threads for additional strength. Valve sizes range from $\frac{1}{4}$ to 2" with either screwed or welded ends.

(Forged steel gate valves are a product of R-P&C Valve Div., of American Chain and Cable Co. Inc., Dept. CP, Reading, Pa. . . . or for more information check CP 3835 on form which is located opposite last page.)

Estimate pulp dilution with
nomograph on page 214

For continuous, and accurate DUST SAMPLING with permanent records



KONISAMPLER
(pat. pend.)

Employs principle of thermal precipitation. Light weight — quiet — all electric Automatic timer — will also operate continuously — secures particulate matter suitable for microscopic, electron microscopic or visual and for permanent records on standard glass slides.

Cost (complete)
with carrying case \$225.00

Send for descriptive literature K-1
Designer and manufacturer
of continuous gravimetric and
oscillating types of
thermal precipitators

JOSEPH B. FICKLEN III
1848 East Mountain St.
Pasadena 7, California

When inquiring check CP 3836 opposite last page

New Corrosion-blocking UCILON® Coatings



Ucilon 1901 is the air-drying neoprene material designed for general maintenance against corrosive fumes. It gives a $6\frac{1}{2}$ mil film in 3 coats. Ucilon 1951, another neoprene coating, offers a catalyzed thick-film topcoat for protection against corrosive solutions.

Newly formulated Ucilon 458 combines the advantages of both vinyl and Thiokol materials. The coating gives a thick film that resists strong chemicals as well as petroleum derivatives.

Bulletin MC-8 gives details on the many Ucilon Coating Systems available to help you fight corrosion. Send for it.

*Trade Mark

UNITED CHROMIUM DIVISION METAL & THERMIT CORPORATION

100 East 42nd Street, New York 17, New York • Waterbury 20, Conn.
Detroit 20, Mich. • East Chicago, Ind. • El Segundo, Calif.
In Canada: Metal & Thermit-United Chromium of Canada, Limited, Toronto 1, Ont.

When inquiring check CP 3837 opposite last page

CHEMICAL PROCESSING



Efficient — $h = 260 \text{ BTU/hr./ft.}^2/\text{Deg. F.}$

Cools corrosive fluids with complete protection

PYREX brand glass shell and tube heat exchanger

Here's a new way to safely cool, condense, partially condense, exchange or reflux corrosive fluids and fluids sensitive to metallic contamination.

It's the PYREX brand glass shell and tube heat exchanger. In this unique new unit, fluids contact only glass, chemically resistant ceramic and Teflon. It brings you relief from fouling, corrosion and contamination. You can use either the shell side or tube side for all fluids except HF or hot concentrated phosphoric acids and alkalies.

You can choose from two capacities: 13½ and 50 sq. ft. Both are compact. The 50 sq. ft. unit, for example, requires only 9" x 13'6" floor space, 13" height and weighs just 165 lbs.

For complete details that show how the PYREX brand glass shell and tube heat exchanger can simplify your corrosive fluids processing, circle the reader service form at the back of this publication.



CORNING GLASS WORKS
Corning, New York

Corning means research in Glass

When inquiring check CP 3838 opposite last page



Specify these injection-molded PVC fittings and flanges

Tube Turns Plastics, Inc. offers unplasticized PVC fittings made by the exclusive Hendry process. These injection molded fittings are superior to those made by conventional methods — minimum tensile strength of High Impact is 6000 psi, of Normal Impact, 7000 psi. Injection molding provides highest density, complete homogeneity. Tube Turns Plastics' fittings are non-toxic and completely inert. Resist both internal and external corrosion and will handle most chemicals up to 165°F. Investigate PVC for piping your corrosive materials. For booklet write Tube Turns Plastics, Inc., Dept. PA-2, 2929 Magazine Street, Louisville, 11, Kentucky.



TUBE TURNS PLASTICS, INC.

Louisville 11, Kentucky

Call your TUBE TURNS PLASTICS' Distributor

When inquiring check CP 3839 opposite last page

FEBRUARY, 1956

ENGINEERING

Higher brake torque in less space by redesign

Uses: Industrial braking applications in the 50 to 100 hp range.

Features: Redesign of unit permits reduced brake dimensions with no decrease in torque rating. Design complies with re-rated NEMA frame size specifications.

Description: Brake operates on magnetic disc principle. Torque ratings available are 230, 345, 460,



Brake housing diameter has been reduced by 2" with no decrease in torque rating

and 575 lb ft. Up to 5¾" less clearance is required for housing removal, and diameter has been reduced 2". Units may be supplied for motor or floor mounting and may be operated on AC or DC.

(H-1200 magnetic disc brake is a product of Stearns Magnetic Inc., Dept. CP, 620 S. 29th St., Milwaukee 46, Wis. Check CP 3840 opposite last page.)

Nylon for maintenance

Specific places where nylon can be used as a maintenance material for mechanical, chemical, and electrical applications are listed in pocket-size folder. Specifications on rod, tubular bar, strip, and tubing available are listed.

"Nylon" is available from The Polymer Corporation of Pa., Sub. of the Polymer Corp., Dept. CP, Reading, Pa. Specify CP 3841 opposite last page.



**"BUFFALO" PUMP
FOR YOUR HEAT
TRANSFER LIQUIDS**

"Buffalo" Pump recently furnished to large aircraft firm for handling high temperature oil.

Specially designed for handling the high-temperature liquids now being used in vapor phase heat transfer, this new "Buffalo" Pump has already proved its reliability.

The "Q" Factor* features listed below will show you the care that has gone into its construction. For ability to handle heat transfer liquids efficiently, the performance of this pump is assured.

If you are concerned with a problem of heat transfer by a liquid medium, write us today for recommendations from our Engineering Department.

These Quality Features!

1. Extra-deep water-cooled stuffing boxes
2. Smothering gland
3. Water-cooled bearings, large oil reservoir
4. Special packing (mechanical seals optional)
5. Colmonoy-coated shaft sleeve thru stuffing box
6. Flexible all steel coupling
7. Cast steel casings and sideplates
8. Centerline support

*The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.



BUFFALO PUMPS

DIVISION OF BUFFALO FORGE COMPANY

524 BROADWAY

• BUFFALO, N. Y.

Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

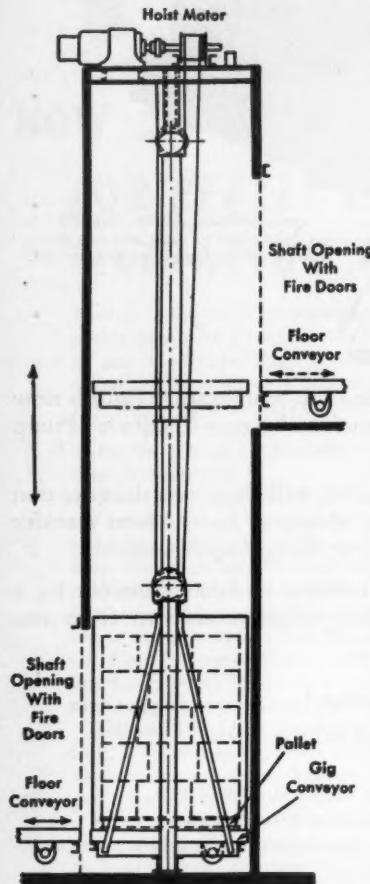
When inquiring check CP 3842 opposite last page

Interfloor

Pallet Handling

3 times faster

Custom-built conveying systems
cut costs for leading breweries



Savings in time, labor, and maintenance—and complete safety. These are the familiar and tested benefits that leading brewers all over the country are getting with G-W interfloor conveying systems.

In moving bottled beer, handling and safety problems are acute. A toppled load cannot be risked. That's why this vertical system was designed to combine automatic operation—between two or any number of floors—with speed and gentle "easy-does-it" delivery.

And gentle it is! Though loads are whisked between floors rapidly, a unique leveling device takes over as they near their destination, and the gig is brought up to the exact level needed for smooth transfer from gig conveyor to floor conveyor. Loading is easy. Pallets move automatically and evenly from a twin-chain conveyor on the floor to a chain conveyor on the floor of the elevator gig, with the fire doors that enclose the shaft opening automatically as the load approaches, and closing automatically after it leaves. The entire system of feeding onto the elevator, lowering or raising, and discharging onto the floor conveyor is fully automatic, dependable and safe in its operation.

Speed, savings, and safety are the benefits of each of Gifford-Wood's custom-designed interfloor handling systems in every industry. Write today for the full story.

GIFFORD-WOOD CO.

Branches: New York, Chicago, St. Louis—Representatives in principal cities

—**FREE 32 PAGE IDEA BOOK** on engineered materials handling installations
GIFFORD-WOOD CO., Hudson, N. Y.

Please send me:

Complete information on the interfloor handling system described above.
 My free copy of your Idea Book describing G-W installations.

Name _____

Company _____

Address _____

City _____

Zone _____ State _____

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When inquiring check CP 3843 opposite last page

ENGINEERING & MAINTENANCE

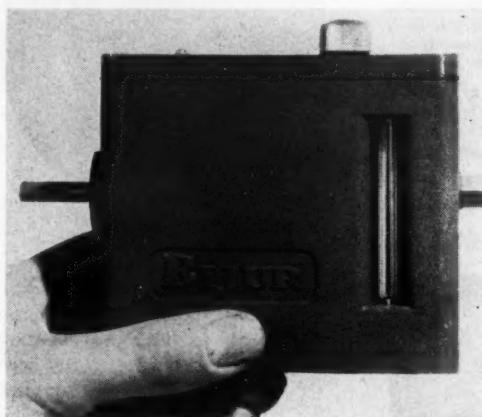
**Machine accuracy maintained
by supplying bearings with
continuous oil film . . .**

rotary pump lubricator prevents uneven wear on critical bearing surfaces

Uses: Automatic lubrication of high precision machines.

Features: Through use of a constant-pressure rotary pump, lubricator maintains a continuous oil film of constant thickness on critical bearing surfaces. Operation prevents objectionable film variation and excess oil drip and maintains machine precision.

Description: Unit maintains a pressure of 20 psi throughout distribution system and at lubrication points by means of a rotary pump. Feed rates range from 0 to 27 cc of oil per minute depending on number of lubrication points on machine and fit of



Lubricator maintains a pressure of 20 psi throughout oil distribution system

bearings. All elements of lubricator system can be fitted into equipment, which must work to very close tolerances, without interfering with its operation in any way.

(Rotary pump lubricator is a product of Bijur Lubricating Corp., Dept. CP, 151 W. Passaic St., Rochelle Park, N.J. Check CP 3844 opposite last page.)

HERRINGBONE REDUCERS



For high horsepower reduction with heavy shock loads, Philadelphia Herringbones are the answer. These quality units are available in Single, Double and Triple Reductions offering wide selection of capacities and ratios. Continuous tooth type herringbone gears assure evenly distributed pressure over each tooth from top to working depth line—which means long life, minimum vibration, quiet operation and maximum transmission . . . Be convinced, send for Catalog H-55.

**PHILADELPHIA
GEAR WORKS
INCORPORATED**

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
BALTIMORE • CLEVELAND

Wiremold Gear & Machine Corp., Louisville, Ky.

Industrial Gears & Speed Reducers • Lim-Torque Valve Controls

When inquiring check CP 3846
opposite last page

CHEMICAL PROCESSING

It's easy to replace seat ring of this gate valve using only a screwdriver . . .

takes 7-10 min with valve installed in line

Seat ring gate valve can be replaced in about seven to ten minutes with only a screwdriver and with valve body still installed in line. Necessary replacement steps are: 1) shut off line, 2) disassemble bonnet, 3) unscrew and lift out seat rings from the body, 4) slip new seat rings into place and secure.

Noteworthy construction feature is that angle of pointed end of retaining screw is complementary to angle of seat ring. Resultant line of contact holds seat rings securely and rigidly in place without excessive pressure being put on screws. Screws are of silicon bronze and will not gall or freeze.

Valves come in rising and non-rising stem, in $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2" sizes suitable for service on 200 and 400 lb WOG lines. Combination of Monel seat ring and nickel alloy wedge make valve tough, corrosion resistant. Valve is of union bonnet construction, with radial body-bonnet joint reinforced by a heavy octagonal union nut.

(Renewable seat ring bronze gate valve is product of The Fairbanks Co., Dept. CP, 393 Lafayette St., New York 3, N.Y. Check CP 3847 opp. last page.)

Gives unvarying, even spray pattern in hot process softeners, deaerating heaters . . .

spray valve provides a constant flow angle under all conditions

Uses: Provides water spray for deaerating heaters and hot process softeners.

Features: Valve's special parabolic plug provides constant flow angle under all conditions to give an unvarying spray pattern.



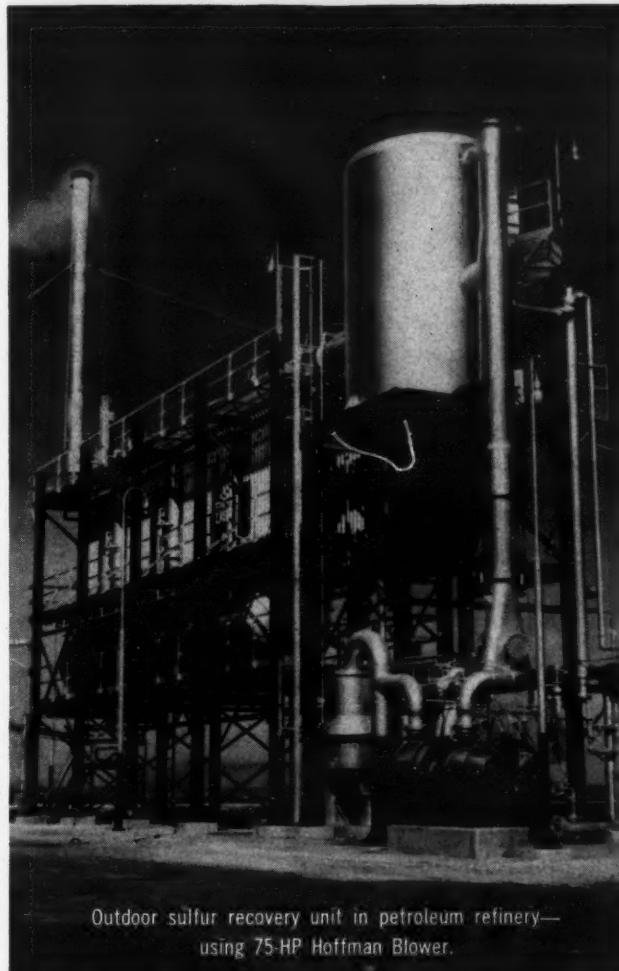
Valve's parabolic plug assures constant flow angle under all conditions

(Spray valve is a product of Graver Water Conditioning Co., Div. of Graver Tank & Mfg. Co., Inc., Dept. CP, 216 W 14th St., New York 11, N.Y. . . or check CP 3848 opposite last page.)

HOFFMAN'S ENGINEERED SYSTEMS

*designed to do
the tough jobs in industry*

WHERE THERE'S NEED FOR SMOOTH STEADY AIR SUPPLY—
HOFFMAN CENTRIFUGAL COMPRESSORS GIVE LOW-COST, LONG-RUN SERVICE



Outdoor sulfur recovery unit in petroleum refinery—
using 75-HP Hoffman Blower.

For process work, for drying, degassifying, or cooling—wherever engineers require air or gas moving under pressure, they are finding the ideal answer in Hoffman Multi-stage Blowers and Exhausters.

These air and gas movers are famous for their long-run, trouble-free, quiet, vibration-less performance. Available in a wide range of capacities, they work equally well as pressure or vacuum source—maintaining pressures up to 9 lbs. psi, and vacuum to 12 inches Hg. Power consumption is directly proportional to volume of gas moved. The dynamically balanced multiple-effect impeller assembly works without gears, valves, vanes, pistons, or other impacting parts—the basis for the remarkable long economical service life. The absence of internal lubricating or sealing fluids assures freedom from contamination.

With auxiliary equipment in Hoffman-engineered pneumatic installations, these compressors are building a new concept of efficient conveying—in salvage and recovery, in sanitation and clean-up, and in moving materials in powder and granular forms.

Technical bulletins describing the design and performance advantages of Hoffman Blowers and Exhausters, and pneumatic systems are available on request.

Please write:



U.S. HOFFMAN MACHINERY CORP.

AIR APPLIANCE DIVISION

DEPT. C.P., 105 FOURTH AVENUE, NEW YORK 3, N.Y.

AIR APPLIANCE DIVISION

*Multistage Centrifugal Blowers and Exhausters
Pneumatic Conveying Equipment
Industrial Vacuum Cleaning—
Portable and Stationary Systems
Continuous Metal Strip Driers
"Smoothflow" Fittings and Tubing*

INDUSTRIAL FILTRATION DIVISION

*Machine Tool Coolant Clarifiers—
Flotation, Mechanical, and Magnetic
Lubricating and Insulating Oil
Conditioners, Filters, and Vaporizers
Solvent Recovery Systems—
Vacuum Stills and Filters*

ORDNANCE EQUIPMENT DIVISION

*Special Pneumatic Conveying Systems
High Efficiency Centrifugal Separators
Stationary and Portable Vacuum
Cleaning Equipment
Process Equipment
Pneumatic Systems for Radioactive
Materials*

When inquiring check CP 3849 opposite last page

Keep Ahead in '56.
With "NATIONAL"
High-Speed Dryers



You can stay in the lead . . . with faster production, lower operating costs and improved product . . . through operation of "NATIONAL" Conveyor Dryers . . . the ultimate in modern Dryer design and efficiency. Pictured above: Upper, large Multiple-Unit, Multiple-Apron dryer; lower, fourteen-section Multiple-Unit Single-Apron machine.

NEW "P-4" CONSTRUCTION

"P-4" Construction means a precision-built, prefabricated, truss-type structure, providing a new measure of strength, rigidity and durability. Advantages to the customer are obvious: Longer service life for the Dryer; smoother operation; freer access for cleaning and maintenance; and reduction of installation time in the customer's plant of as much as 50%.

IMPROVED HOUSING PANELS

The new insulated panels (Patented and Patents Pending) used for the housing are larger, stronger, more rigid, and, with their 4" insulation, provide greater protection against heat loss. They are of trussed-and-tensioned, non-through-metal construction and incorporate expansion-contraction compensation.

IMPROVED AIR DISTRIBUTION AND CONTROL

The exceptionally high drying speed of "NATIONAL" Dryers results from a combination of adjustable fan power and unique air distribution system, controlled to assure equal volume of air to the entire run. There is no "shading" — no uneven drying. This arrangement permits drying at consistently higher speeds than those previously permissible.

SUPER-POWER FANS

"NATIONAL" has developed the adjustable-pitch principle into its axial-flow fans which provides for greater operating potential than heretofore used in any drying machinery. Greater speeds and volume of air can now be employed and adjusted to the specific requirements of the drying operation. Fan mountings, insulation and lubricating systems have been redesigned to provide improved smoothness of operation and virtually no maintenance.

THE DRYING MACHINERY CO.
LEHIGH AVENUE and HANCOCK STREET
PHILADELPHIA 33, PENNA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass.
Cable Address: "NADRYMA" — W. U. Code

Write for Complete Information

ENGINEERING & MAINTENANCE

Nozzle removes obstructions
for unimpeded flow of water
to be atomized . . .

will not clog regardless of amount of lint or fine foreign matter



Flexible diaphragm (at pencil point) expands to expel obstructions

available in conventional sizes and can be used to replace existing nozzles in a wide variety of air conditioning equipment.

(Cant-Clog spray nozzles are a product of Carrier Corp., Dept. CP, Syracuse 1, N.Y. . . or for more information check CP 3851 on form opposite last page.)

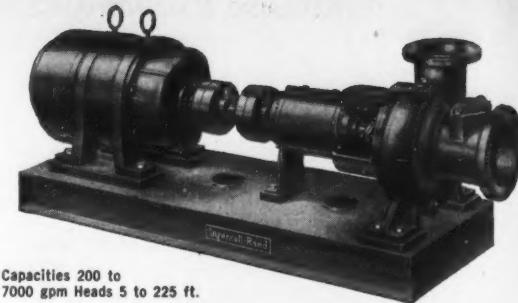
High vacuum diffusion pump
designed for moderate
sized systems . . .

unit can also be used as a booster pump by changing pumping fluid

Uses: Establishing and maintaining a vacuum in moderate sized systems.

Features: Fractionating diffusion pump has a speed of 1700 liters/sec in pressure range from 5×10^{-4} to 5×10^{-5} mm of mercury and a throughput of 3800 liters/sec at 10 microns.

Description: Using different pumping fluid, unit can act as a booster pump with a speed of 2000 liters/sec at 1 micron and 6000 liters/sec at 10 microns. Blank-off point as a diffusion pump is $1 \times$



Capacities 200 to
7000 gpm Heads 5 to 225 ft.

NEW INDUSTRIAL LIQUIDS PUMP

handles liquids containing
solids, air or gases

NON
VAPOR-BINDING
SELF-VENTING
NON-CLOGGING
SELF-REGULATING



This radically new Ingersoll-Rand single-stage centrifugal pump handles the toughest jobs in pumping industrial liquids.

It effectively pumps solutions containing up to 50% entrained air or gases without vapor-binding. Viscous mixtures with high solid content are readily handled without clogging.

For further details, write for Form 7325.

IB-3H

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

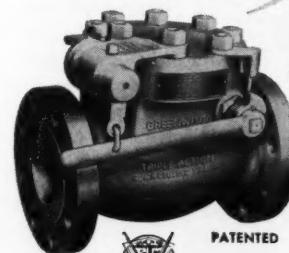
PUMPS • COMPRESSORS • DIESEL ENGINES • AIR & ELECTRIC TOOLS
TURBO BLOWERS • CONDENSERS

When inquiring check CP 3852 opposite last page

PROTECT YOUR PLANT AND EQUIPMENT
FROM THE DAMAGES OF FIRE!

PLAY IT SAFE...install GREENWOOD Triple-Action Quick-Closing Valves on all lines and tanks handling volatile or combustible products. When fire breaks out . . . VALVE CLOSES INSTANTLY (or valve may be remotely controlled in emergency)...confining and isolating products that cause the spreading and destructive action of fire. Write for details on these popular GREENWOOD Valves...they're the cheapest kind of fire insurance. Ask for Bulletin GV-11.

• GREENWOOD Triple-Action Quick-Closing Valves are available in 1", 2", 3", 4", 6" and 8" pipe sizes.
• Valves are regularly made of cast steel with stainless steel trim. Available for special services in monel, stainless steel or other alloys.



GREENWOOD VALVE DIVISION
PATENTED

GREENWOOD
Triple-Action
Quick Closing
Valves

Valves may be closed
three ways:
1 FIRE MELTS FUSIBLE
LINK.

2 REMOTE MANUAL CABLE
CONTROL.

3 APPLIED AIR PRESSURE
OR AIR FAILURE.

VERNON TOOL CO., LTD.

1101 MERIDIAN AVENUE • ALHAMBRA, CALIFORNIA

When inquiring check CP 3853 opposite last page

CHEMICAL PROCESSING

When inquiring check CP 3850 opposite last page



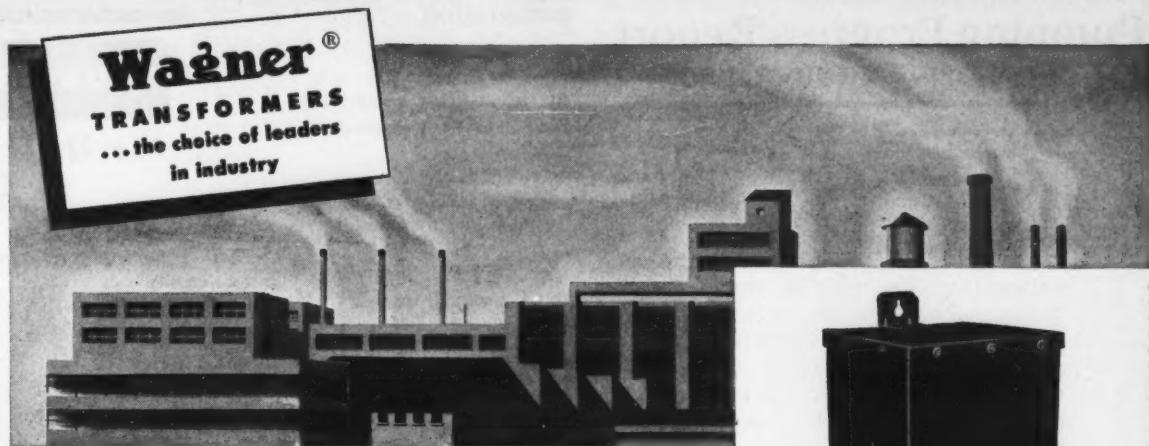
Diffusion pump has maximum tolerable forepressure of 200 microns

10^{-6} mm of mercury with a maximum tolerable forepressure of 200 microns. As a booster, blank-off is better than 1.5×10^{-4} mm of mercury and tolerates a forepressure of 400 microns.

(H-10-P diffusion pump is available from Naresco Equipment Corp., sub of National Research Corp., Dept. CP, 160 Charlemont St., Newton Highlands 61, Mass. . . or for more information check CP 3854 on convenient Reader Service slip which is located opposite last page.)



"Our engineers went over your vacuum pump problem very carefully and we'd like to suggest . . ."



YOU SAVE MONEY 3 WAYS with Wagner Dry-Type Transformers

1. shorter runs of copper
2. reduced line losses
3. lower installation expense

For portable tools, machines or lighting systems, these compact, light-weight Wagner Dry-Type Transformers get the *right* voltage close to the load—give you a flexible, modern power system.

The 150° rise, totally-enclosed dry-type transformer is designed especially for use where ventilated transformers are impractical. Core and coil is protected from lint, moisture, dust and other contaminating materials by totally-enclosed sheet steel cases . . . and this kind of protection reduces maintenance to almost nothing. They can be installed outdoors, because their construction is completely weatherproof.

The 150° rise transformer is standard in ratings 3 through 10 kva and is also available through 50 kva. The 55° rise model is standard in 1, $1\frac{1}{2}$ and 2 kva and the 80° rise transformer is standard in ratings 15 through 100 kva.

Higher voltage single-phase transformers and three-phase transformers in ratings above $112\frac{1}{2}$ kva are housed in ventilated enclosures formed of structural steel with removable panels. They are designed for floor or platform mounting and are suitable for indoor use only.

Write today for Bulletin TU-57.



Single-phase
Dry-Type Transformer. 150°C.



Single-phase
Dry-Type Transformer. 55°C.



Three-phase
Dry-Type Transformer. 80°C.

Wagner Electric Corporation
6359 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES



ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

When inquiring check CP 3855 opposite last page

Pumping Progress Report

FOR CHEMICAL ENGINEERS

An advertisement prepared by The Aldrich Pump Co., Member of Hydraulic Institute, U.S.A.

SPACE, in many pump installations, is a major problem. Another is the necessity for special foundations. For new installations these factors may dictate elaborate construction; for replacement or modifications of existing systems, expensive piping and equipment changes.

COMPACTNESS OF DESIGN, while often desirable, is not necessarily the answer. Simplicity of design may be a better solution.

SIMPLICITY OF DESIGN brought about the first Inverted Triplex and Quintuplex and ultimately Septuplex and Nonuplex Pumps. This Aldrich design innovation brought to users economies of space, maintenance and operation they had never known. And even more important, Multiplex pumps brought new freedom from pulsation.

INVERTED PUMP DESIGN permits the use of less expensive foundations. With the crankshaft located near the floor there is no need to raise the driver or lower the pump. Then, too, inverted pumps require fewer square feet of floor space than conventional pumps.

MAINTENANCE COSTS ARE REDUCED. Fluid-end, where most work is done, is at chest level. Sectionalization, another Aldrich innovation, and parts standardization permit ease and economy of inspection or replacement.

TELL US ABOUT YOUR PUMPING PROBLEM. The chances are that one of our standard pumps — or a modification — will do your job. Detail your problem and we'll send you our Data Sheet describing the Direct Flow Pump we recommend. Write to: The Aldrich Pump Company, 23 Gordon Street, Allentown, Pa.

When inquiring check CP 3856 opposite last page

ENGINEERING

Increase filter's capacity four fold over previous models . . .

unit is porous ceramic cylinder easy to install

Uses: Filtering water supply being pumped from lake, stream, well, cistern, pond, or pool.

Features: Filter has capacity four times greater than previous models. It will trap and filter out all suspended foreign matter such as sand, grit, gravel, algae, insects, and other substances which might damage pumping equipment.



Filter has threaded end and can be screwed onto water line

Cleaning can be accomplished by either disassembling, by removing single bolt, or simply reversing water flow direction. Filter is available in coarse, medium, or fine grades.

(Flo-clear filter is a product of Filtros Inc., Dept. CP, East Rochester, N.Y. . . . or for more information check CP 3857 on form opposite last page.)

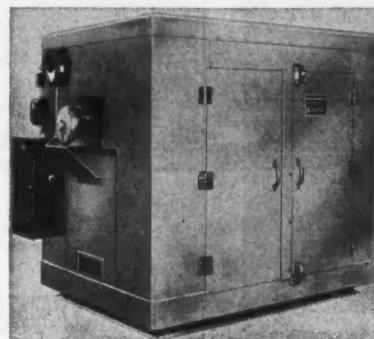
Discusses metal grating for vessel linings

Specifications, characteristics and applications of metal gratings, as armor and retainer for castable refractory monolithic linings, are discussed in four-page, two-color pamphlet. A list of typical users in the oil industry is given.

Bul on Hexteel and Floorsteel is issued by Klemp Metal Grating Corp., Dept. CP, 6609 South Melvina Ave., Chicago 38, Ill. When inquiring specify CP 3858 on form opposite last page.

YOUNG BROTHERS OVENS and DRYERS

**for Uniform Results in
Baking, Drying, Curing, Dehydrating**



Electrically heated, multiple shelf-type dryer with automatic indicating control



1825 Columbus Road

Cleveland 13, Ohio

When inquiring check CP 3859 opposite last page

**Improved Cabled Instrument Tubes
Have No Distortion
Even When Tied In A Knot**



C R E S C E N T P O L Y E T H Y L E N E M U L T I T U B E

with Spirally Cabled Tubes

CRESCEENT POLYETHYLENE MULTITUBE is composed of 2 to 19, $\frac{1}{4}$ " O.D. Polyethylene tubes up to 1000 feet in length, spirally cabled together to allow bending with a short radius without distortion of the tubes. The tubing assemblies are protected by a flexible interlocked galvanized steel armor (Type PA), or by a tough corrosion-resistant thermoplastic sheath (Type PT). Tubes are furnished in seven contrasting colors for ready identification of each tube at both ends. Both constructions are flame retardant.

Economy is achieved in the initial cost of CRESCEENT POLYETHYLENE MULTITUBE as well as in substantial savings in labor costs of installation. Moderate to long length runs of light weight and compact MULTITUBE assemblies result in fewer connections and fittings, lower cost for supports or racks, ease of mounting, less space being used.

CRESCEENT POLYETHYLENE MULTITUBE can be pulled through conduit or raceways.

Show here—
19 TUBES
TYPE PT

Send For Bulletin Giving Complete
Information and Engineering Data

C R E S C E N T I N S U L A T E D W I R E & C A B L E C O.
TRENTON, N. J.

When inquiring check CP 3860 opposite last page

CHEMICAL PROCESSING

Clips on Insulation —
is flush with
surface . . .

with no projections, it can't hurt personnel or tear vapor barrier

Uses: For use with impaled insulation on air conditioning ducts.

Features: When pushed home, the clip is flushed with insulation and assures a smooth, unbroken surface on exterior. There are no sharp projections. Flush Clip safeguards personnel, won't puncture or tear a vapor barrier.

Description: Flush Clip fits over pin which is welded to metal duct. It has proven to operate ideally with manufacturer's Spintex Insulation, plain and faced. It was developed in cooperation with Graham Manufacturing Corp.

(Graham Flush Clip is product of Johns Manville, Dept. CP, 22 E. 40th St., New York 16, N.Y. . . . or check CP 3861 opposite last page.)

**Forms permanent bond to metal,
 wool, glass, or plastic —
 no heat or mixing . . .**

moldable metal in paste form combines aluminum pigment and resin to give hard surface

Uses: Filling blowholes and sand holes in metal castings, building up a long-wearing finish on foundry patterns, or providing hard, rustproof, waterproof, metallized surface for other industrial uses.

Features: Cold metal solder, upon drying, hardens to form a strong, permanent bond to metal, wood, plaster, glass, or plastic. It can be filed, drilled, chiseled, tapped, or ground and withstands temperatures from -40°F to +350°F.

Description: Moldable metal is an aluminum-based compound in paste form. Combination of metal and resin can be used without heating or mixing and will not shrink, crack, chip, or peel. It has a tensile strength of 650 psi and a Rockwell E. hardness between 4 and 8. Solder is unaffected by mild acids, alcohols, toluene, ether, petroleum and petroleum solvents. Spreads with putty knife.

(Lab-Metal Solder is a product of Alvin Products, Inc., Dept. CP, 20 Houghton Ave., Worcester, Mass. Check CP 3862 opposite last page.)



Announcing . . .
**the new,
 exclusive**

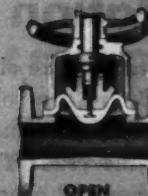
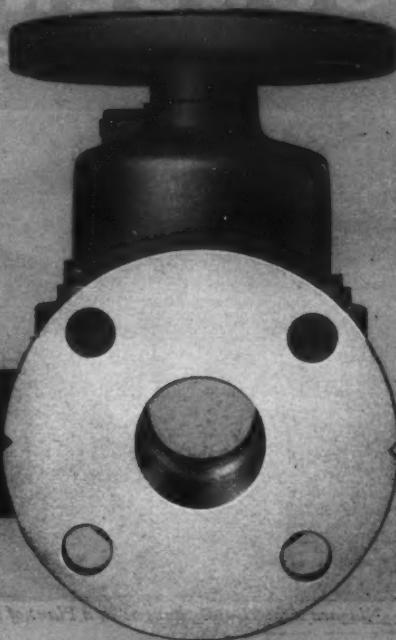
GRINNELL- SAUNDERS

STRAIGHTWAY

DIAPHRAGM

VALVE

... the diaphragm valve with
STRAIGHT-THROUGH FLOW,
 for handling viscous materials,
 fibrous slurries, sludges, pulp
 stock, latex, magmas, semi-fluid
 foods, solids in suspension,
 sewage, water, corrosive chemicals



Diaphragm lifts high for
 streamline flow in either
 direction. No pockets to
 trap sludge

Diaphragm presses tight
 for positive closure even
 when handling gritty or
 fibrous materials

Grinnell-Saunders STRAIGHTWAY Diaphragm Valve* offers you these exclusive features: the ability to handle viscous materials without restriction or stoppage; minimum pressure drop; rodding or brushing without need of removing bonnet and without possibility of damaging body linings; self-draining when line is pitched sufficiently to drain piping.

Grinnell-Saunders STRAIGHTWAY Diaphragm Valves are available in a range of body, lining and diaphragm materials. Inquiries invited. Bulletin on request.

*Patented

GRINNELL COMPANY, INC.
 236 West Exchange St., Providence, R. I.
 Kindly send me a complimentary copy of your "Grinnell-Saunders Straightway Diaphragm Valve" bulletin.

Name _____
 Title or function _____
 Company _____
 Address _____
 City _____ State _____



Grinnell Company, Inc., Providence, Rhode Island

• Coast-to-Coast Network of Branch Warehouses and Distributors
 pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
 Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
 industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

When inquiring check CP 3863 opposite last page

IMPROVED CONDENSING and Cooling of Reflux



Niagara Aero Heat Exchangers at a Plant of the Heyden Chemical Corp.

Get Better Control of Distillation Product

• Liquid or vapor temperatures are always held constant by the Niagara "Balanced Wet Bulb" control method of evaporatively cooling or condensing, which automatically varies the cooling effect proportionately to the load. The distillation product is therefore uniform throughout all changes in climatic conditions the year around; it is the same in the heat of summer as in the freezing cold of winter. Continuous maximum production is thus insured.

Non-condensibles are effectively separated at the condensate outlet, with notable sub-cooling after separation for greater vacuum pump efficiency.

NIAGARA AERO HEAT EXCHANGERS give sustained full capacity in cooling and condensing with no dependence on cooling water . . . eliminating problems of water supply, availability, temperature, or quality.

For full information write for Bulletin 120

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

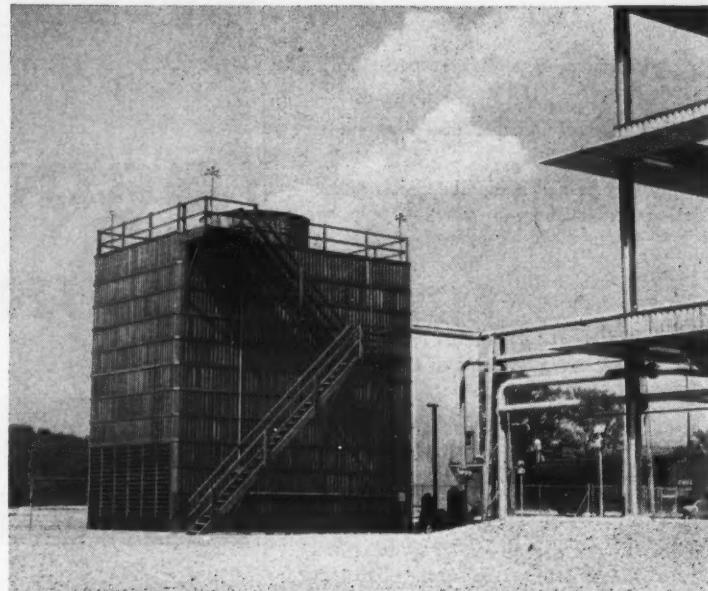
Dept. C.P., 405 Lexington Ave.

New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

When inquiring check CP 3864 opposite last page

engineering and maintenance



Cooling tower lends luster to Central Soya's soybean processing plant at Chattanooga

At Central Soya's recently-opened soybean processing plant, induced draft tower provides —

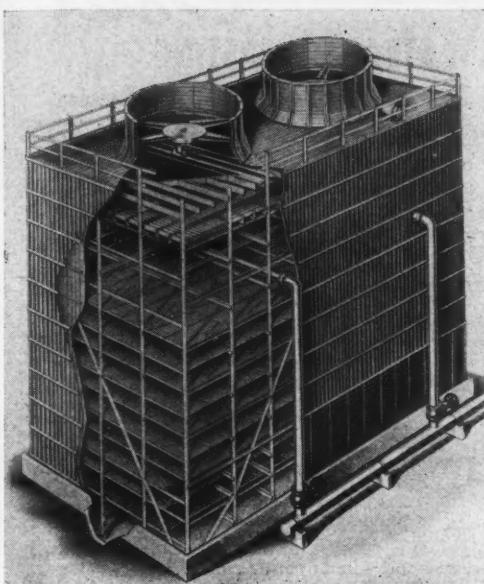
*beauty as well as utility
while cooling condenser water*

One-cell unit efficiently cools 1500 gpm of water by employing principles of essentially true counterflow, uniform water distribution, repeated water breakup, and even air movement

By GORDON WEYERMULLER, Associate Editor
with MAX R. SPENCER, Plant Production Eng.
Central Soya Company, Chattanooga, Tennessee

One of the factors adding to the attractive appearance of Central Soya's modern soybean processing plant, which went into operation in April 1955, is the beauty of the cooling tower used for condenser water. In addition to providing efficient cooling

by full utilization of four basic principles, the induced-draft cooling tower is fabricated in an artistic design which would enhance the appearance of any industrial installation. Cooling tower is presently handling 1500 gpm of water although it is designed to handle 1800 gpm under maximum conditions. Temperature of water is lowered 20°F with a 7°F approach to wet bulb temperature. W. H. & L. D. Betz Co.'s Orocil inhibitor is added to water passing through



Construction of tower combines strength and corrosion resistance with efficient cooling

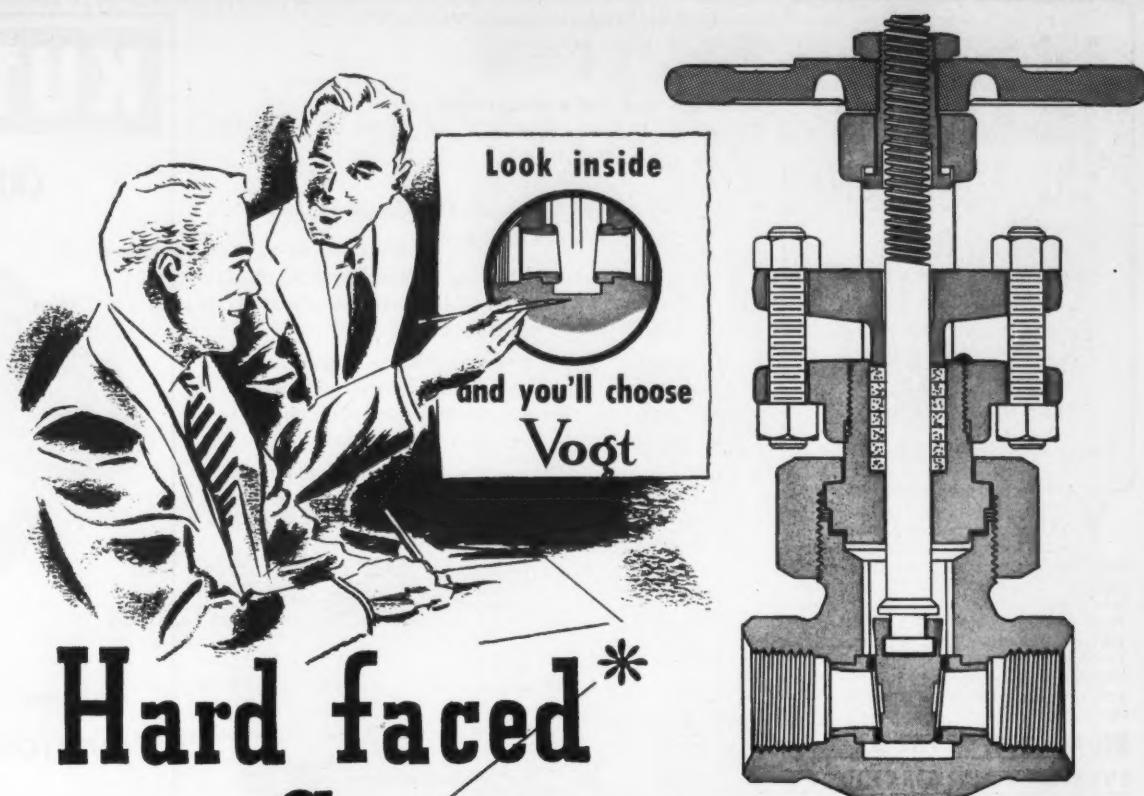
tower to control corrosion. Tower combines strength and corrosion resistance with its operating efficiency.

In order to provide efficient cooling, the one-cell tower makes maximum use of 1) essentially true counterflow 2) uniform water distribution 3) repeated water breakup and 4) even air movement. Water to be cooled is conducted through a distribution system and dispersed through nozzles into a spray chamber near the top of the tower. As the water falls toward the basin of tower, droplets are further broken up for greater surface exposure.

As the water descends, it is in constant contact with a stream of air being pulled in at the base of the tower. As air is drawn upward by fan on top of tower, it accumulates heat from the falling water by means of evaporation. To prevent excessive loss of water, air passes through drift eliminator at top.

Among features of tower is stainless steel fan designed specifically for this service so that air foil handles maximum air volumes at minimum tip speeds and horsepower requirements. Speed reducers incorporate curved tooth, spiral bevel gears which provide quiet, smooth operation. Cutout switch protects tower fan assembly should excessive vibration suddenly occur. Design also incorporates gusset plate joint connectors similar to that used in bridge construction and sloping-bar grid decking. Another advantage of tower is that it is completely prefabricated.

(Cooling tower is manufactured by Fluor Products Co., div. of The Fluor Corp., Ltd., Dept. CP, 12000 E. Washington Blvd., Whittier, Calif. . . . or for more information reader may simply check CP 3865 on form opposite last page.)



Hard faced* Seating

... at no extra cost!

STELLITE faced seating surfaces are among the many plus advantages offered by Vogt General Purpose Valves. Fusion welded to the removable stainless steel seat rings of gate valves and to the integral seat of globe and angle valve bodies, tough, long-wearing STELLITE affords amazing resistance to erosion, corrosion and galling.

The new line of Vogt drop forged steel GP's completely fills the demands of industry for a line of compact, lighter weight, shorter

face-to-face valves. They assure operation economies and longer life and are available in a complete range of sizes and types from $\frac{1}{4}$ " to 2". They are rated 800 pounds at 850°F. and 2,000 pounds at 100°F. Send today for free catalog.

Adv. No. 2 in a series describing the features of Vogt G-P Valves.



Write for your FREE COPY of Supplement No. 1 to Catalog F-9. Address Dept. 24-FCP.

HENRY VOGT MACHINE CO.

P.O. Box 1918

Louisville 1, Kentucky

SALES OFFICES:

New York, Philadelphia, Cleveland, Chicago, St. Louis, Charleston, W. Va., Cincinnati, Dallas, San Francisco



When inquiring check CP 3866 opposite last page

ENGINEERING & MAINTENANCE

**"THIS LUBRICANT
INCREASED
BEARING LIFE
FROM 2 WEEKS
TO 2 YEARS"**

—says THE GLOBE COMPANY

"Animal acids and moisture, most harmful to ball and roller bearings prevails in the entire meat packing industry. With conventional lubricants, some of the bearings in our Roto-Cut machines did not last two weeks. Since using Ball Bearing LUBRIPLATE in machines operating continuously 24 hours a day for over two years, we have not had a single bearing replacement."

**REGARDLESS OF THE SIZE AND
TYPE OF YOUR MACHINERY,
LUBRIPLATE LUBRICANTS
WILL IMPROVE ITS OPERATION
AND REDUCE MAINTENANCE**



For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



When inquiring check CP 3867
opposite last page

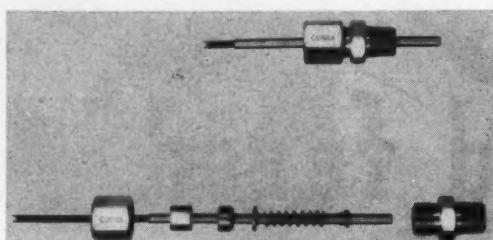
**High thermal conductivity
given thermocouples
by spring loading . . .**

positive contact, small two-wire pyod construction insure fast response

Uses: Checking bearing temperatures, surface temperatures, injection molding machine temperatures, and other similar applications.

Features: Spring loading of thermocouples insures positive contact for high thermal conductivity. Small, $\frac{1}{8}$ " diameter, two-wire pyod construction coupled with good contact give unit fast response.

Description: Fittings and tubes are made from Type 303 stainless steel. Tubes are available in lengths to meet particular application requirements.



Thermocouples seal vacuum or pressure to 200 psi

Sealing method eliminates entry of foreign matter into system as well as sealing internal vacuum or pressure to 200 psi. Thermocouples are available with either iron-constantan or copper-constantan calibrations. Standard pipe thread connection is $\frac{1}{8}$ " IPS.

Pressure sealing spring loaded thermocouples are a product of Conax Corp., Dept. CP, 7811 Sheridan Dr., Buffalo 21, N.Y. . . . or for more information check CP 3868 on form opposite last page.)

**Provides oil-free compressed air
using intermeshing rotors
that never touch . . .**

compressor operates with little maintenance for long periods of continuous service

Uses: Providing compressed air or gas in range from 15 to 50 psig.

Features: Compressor can provide oil-free air by means of two blowers using intermeshing male and female rotors which compress the gas between lobes and grooves during rotation, although they never actually touch. Small clearance between rotors gives a continuous air seal.

Description: Since there is no friction between rotors, no internal lubrication is required. Continuous operation over long periods of time is possible with

KUTZTOWN Skill

CREATES A STRAINER CASTING

made of Ni-Resist

Note the slots inside this casting and the cleanly shaped flange supports. Small lids were cast but are not shown in the photograph. Ni-Resist (developed by the International Nickel Co.) is a special nickel alloy of the gray iron type possessing remarkable qualities of corrosion and heat resistance. It is resistant to the corrosive effects of alkalies, acids, salts, plastics, foods and oils. There are many casting applications in the chemical, food, oil and drug industries where extreme heat is present — such applications can be met easily by the use of castings of Ni-Resist!



• GRAY IRON

• PRESSURE IRON
• LO-ALLOY IRON

• HIGH TENSILE IRON
• DUCTILE IRON

• NI-RESIST

KUTZTOWN FOUNDRY & MACHINE CORP.
KUTZTOWN, PENNSYLVANIA

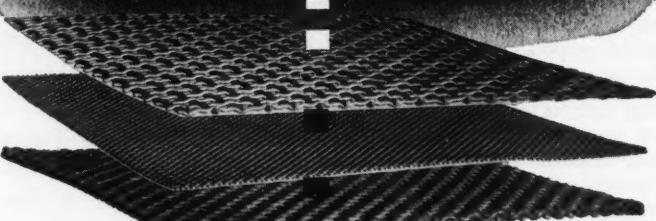
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Sure, we sell HOLES but our STRAINERS & FILTERS

ARE MADE OF REAL QUALITY MATERIALS

BY MASTER CRAFTSMEN

THAT'S OUR BUSINESS



COMPLETE SELECTION OF WEAVES, SIZES, METALS

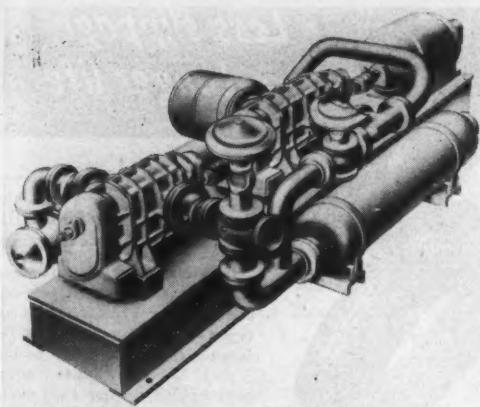
For long life and accuracy—Specify "Cleveland." We weave wire cloth & wire screens, we fabricate strainer and filter screens to individual job requirements. Quantities: One to One Million in all commercial metals and alloys. We have the equipment, facilities, and experience to better serve your needs for strainer and filter elements.

WRITE FOR BULLETIN No. 7

THE CLEVELAND WIRE CLOTH & MFG. CO.
3573 E. 79th STREET • CLEVELAND 5, OHIO

When inquiring check CP 3870 opposite last page

CHEMICAL PROCESSING



Positive-displacement, axial-flow blowers give discharge pressures from 15 to 50 psig

little maintenance. Unit is available in capacities from 100 to approximately 4000 cfm ranging from 15 to 600 hp. Positive-displacement, axial-flow blowers work in two stages to give discharge pressures from 15 to 50 psig. For gas service compressor is equipped with mechanical seals; for air, with labyrinth seals.

(Standardaire compressor is a product of Read Standard Corp., Dept. CP, 370 Lexington Ave., New York 17, N.Y. . . . or for more information check CP 3871 on form opposite last page.)

Impact and thermal shock resistance mark sight glasses fabricated from Kel-F resin . . .

can be used from -320° to $+390^{\circ}\text{F}$, have chemical resistance and clarity

Uses: As sight glasses in applications where impact and thermal shocks are encountered.

Features: Units have high impact strength at both low and high temperatures. Thermal shock resistance is very good. Glasses have a clarity that's comparable to glass, and resist action of corrosives.

Description: Sight glasses are made from Kel-F resin, a polymer of trifluorochloroethylene. They have zero moisture absorption and dimensional stability is not affected by direct contact with water or under high humidity conditions. Bearing loads of 8000 psi give a permanent set of only 4 to 5%. Sheets are molded flat, and come in thicknesses up to $\frac{1}{8}$ inch. Standard machining techniques can be used on them.

(Plastic sight glasses are a product of Nichols Engineering Inc., Dept. CP, Old Stratford Rd., Shelton, Conn. . . . or for more information check CP 3872 on form opposite last page.)

JENKINS Fig. 106-A

The FIRST
Renewable Composition Disc
BRONZE GLOBE VALVE
150 lbs. Steam 300 lbs. O.W.G.
 $\frac{1}{8}$ in. to 3 in.

Making a Work Horse a Champion

Take a Fig. 106-A apart. It's easy to see the reason why it's the "champion" of disc-equipped Bronze Globes. Every part, from heatproof handwheel to pipe ends, reflects the design and construction skill of generations of Jenkins Valve specialists.

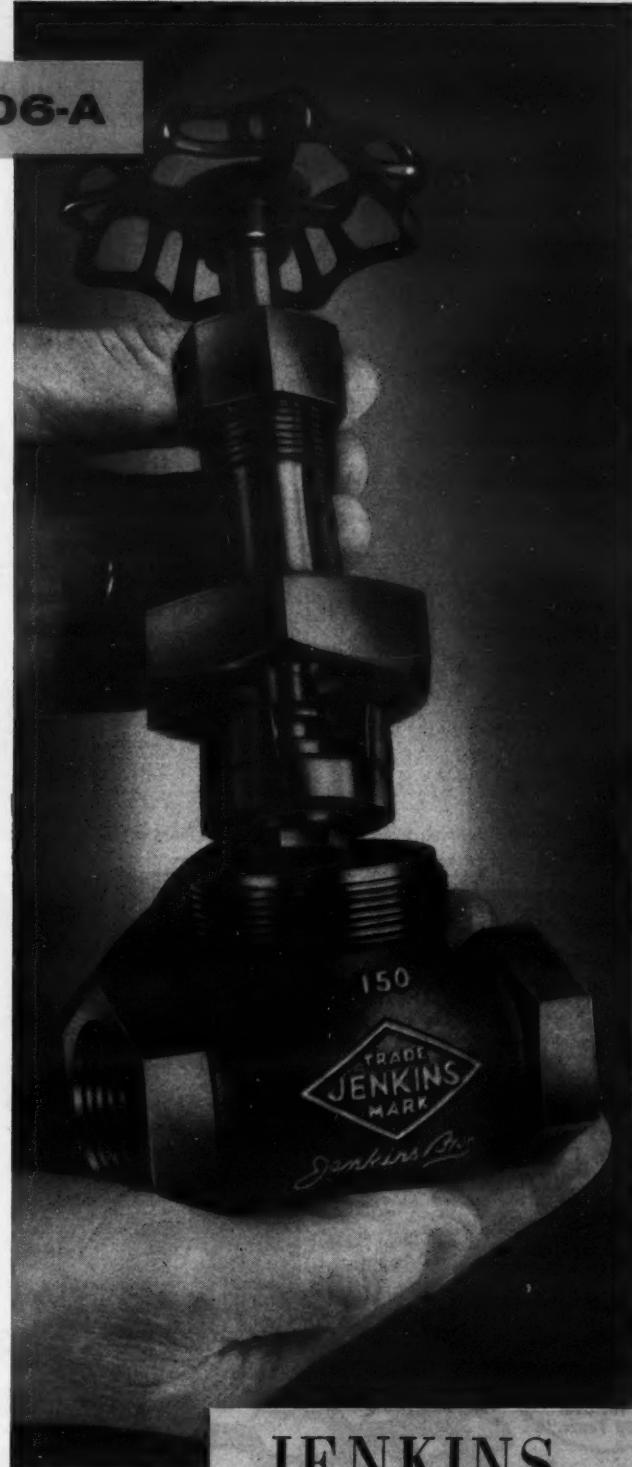
Jenkins Bros. introduced the first renewable composition disc Globe . . . is still the only manufacturer of both valves and discs.

Fig. 106-A not only looks better — it proves out better in performance. In any comparison, its long-life, low-up-keep record has always set the standard. That is the true measure of valve cost — and it is the reason why industry's shrewdest buyers will settle for nothing less than Fig. 106-A quality.

The Fig. 106-A "family", with interchangeable parts, provides Globe, Angle, and Check patterns to meet 90% of average valve needs.

Ask your Jenkins Distributor for full information, or write: Jenkins Bros., 100 Park Ave., New York 17.

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JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES



When inquiring check CP 3873 opposite last page



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for all filtering and straining applications.
All meshes, all weaves, all alloys.



Send Specifications for an estimate. Department 27



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MANUFACTURING CORP. SOUTHPORT, CONN.

When inquiring check CP 3874 opposite last page

Prevent Excessive Wear
to Vessel Liners by Ar-
moring them with...

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Hexteel and Floorsteel are carbon or stain-
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refractory monolithic linings. They prolong
the life of an installation by retarding
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Kindly send me literature describing Hexteel and
Floorsteel applications in the petroleum and
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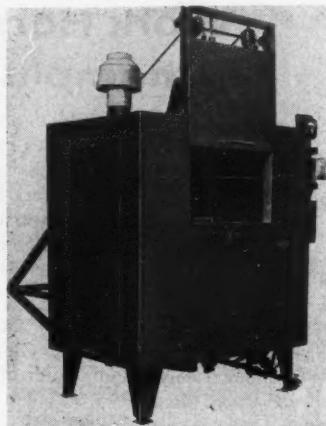
ENGINEERING

Handles vinyl plastics
through complete gel
and fuse cycles

Uses: Molding vinyl plastics.

Features: Rotational molding machine is specifically designed to handle vinyl plastics through complete gel and fuse operation. Time cycles vary from 5 to 8 minutes.

Description: Molds of any size up to 19" in height may be used. Unit uses two gang plates which can be removed alternately or to-



Molder can be electrically or gas heated

gether. Molder measures 75" high x 65" wide x 40" deep. It can be electrically or gas heated.

(Model SD, SDE rotational molders are a product of Mercury Industries, Inc., Vinyl Plastics Div., Dept. CP, Hillside, Bergen Cy., N. J. Check CP 3876 opp. last page.)

Fintube heat transfer in boilers depicted

Company's application of fintube heat transfer principles in boiler construction is discussed in four-page catalog. Space requirements, capacities, and dimensions are listed and compared with standard boilers.

Bul 554 is available from Brown Fintube Co., Dept. CP, 150 Huron St., Elyria, Ohio. Specify CP 3877 opp. last page.

BETTER PERFORMANCE

- Less slippage
- Longer life



Try Darcova Pumcup in your reciprocating pumps and cylinders, and you too will realize what a big difference they make.

Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for out-lasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time?

Get all the facts

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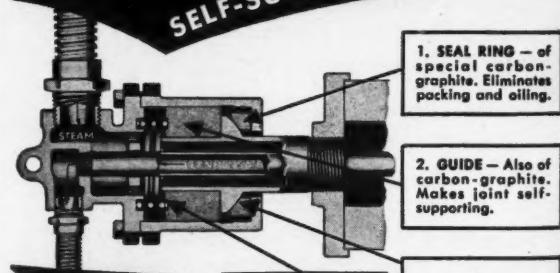
DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.



TRADE MARK
PUMCUP

When inquiring check CP 3878 opposite last page

JOHNSON Rotary Pressure JOINT SELF-SUPPORTING TYPE



Only 4
Internal
Parts

1. SEAL RING — of
special carbon-
graphite. Eliminates
packing and oiling.

2. GUIDE — Also of
carbon-graphite.
Makes joint self-
supporting.

3. NIPPLE — Rotates
with roll, seals
against ring.

4. SPRING — For
initial seating only.
In operation joint is
pressure sealed.

For introducing steam and liquids into
rotating rolls and cylinders, there's
nothing like the Johnson Joint above.
It's packless, self-lubricating, self-ad-
justing, self-supporting. It has been
adopted by dozens of machinery makers, and is finding
new uses every day.

Type SB shown handles both steam and condensate through same
head; also available for through flow service, and in sizes and styles
for all operating conditions. Write for literature.

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

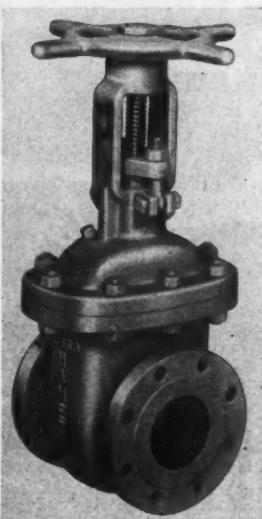


When inquiring check CP 3879 opposite last page

CHEMICAL PROCESSING

Provides impenetrable shut-off on upstream and downstream side of valve wedge . . .

Teflon packing seals form an impenetrable seal



Gate valve has stainless steel seat lightly welded to valve body to prevent leak through

Uses: Complete and impenetrable shut-off of fluid flow in refinery and chemical plant pipe lines.

Features: Precision metal-to-metal contact of wedge and valve body seats, and two Teflon packing seals which press dead-tight against wedge, provide impenetrable line shut-off both on upstream and downstream side of wedge in gate valve.

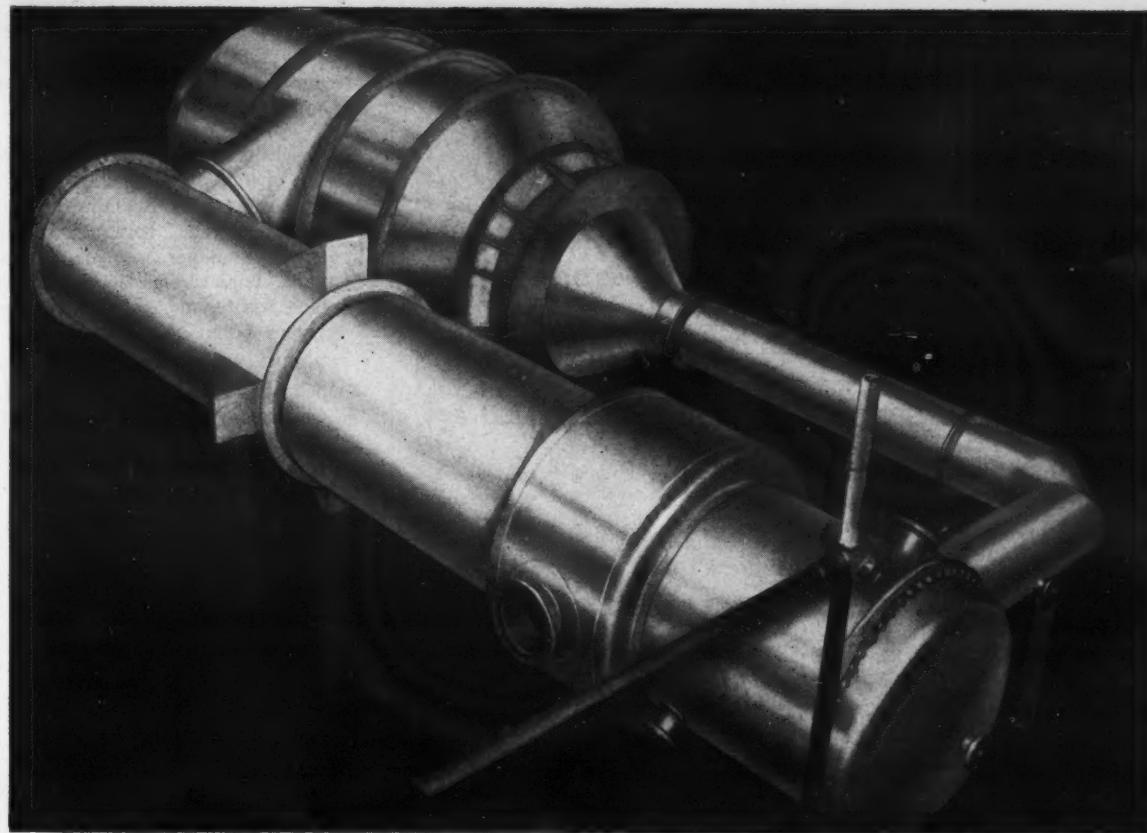
Description: Stainless steel seat is lightly welded into valve body to insure against leak-through. Locking rings are also of stainless giving valve good resistance to corrosive fluids moving through line. Unit is smooth operating, requires only a minimum of maintenance, and can be serviced in the line when necessary.

(Gate valve is a product of Hamer Valves, Inc., Dept. CP, PO Box 1851, Long Beach 1, Calif. . . . or for more information check CP 3880 on form opposite last page.)

Gear engineering data, design and selection

Complete engineering data concerning design, manufacture, and selection of industrial gearing are presented in 73-page engineering catalog. Information given includes data on spur, helical, herringbone, spiral, worm, zerk, hypoid, and other gearing used in industry. Special sections are devoted to tables of useful data for design of drive systems. Special attention is given to outlining correct applications for various gear designs.

Cat G-655 is available from Philadelphia Gear Works, Inc., Dept. CP, Erie Ave. and G St., Philadelphia 34, Pa. When inquiring specify CP 3881 on the convenient form which is located opposite last page.



Why STAINLESS STEEL is best for processing Glacial Acetic Acid

This special type calandria evaporator processes glacial acetic acid. Yet its vital parts—tubes . . . liquid and vapor heads . . . downleg and centrifugal separator—are almost indestructible in this service. That's because they're fabricated of Crucible stainless steel, type 316.

The fabricator, Badger Manufacturing Company, chose type 316 stainless because it is one of the best known alloys for handling acetic acid. It is completely resistant to acetic acid in all concentrations, and under the majority of pressure and temperature conditions. And, most important, stainless steel does not contaminate glacial acetic acid.

Its physical properties make stainless a wise choice, too. Its high tensile strength means mini-

mum structural support. Its practical workability permits forming complex sections without undue trouble. And these sections are readily welded, since type 316 is designed to inhibit the precipitation of harmful carbides on cooling from high temperatures.

If you're concerned with the manufacture or use of chemical processing equipment, check the advantages offered by the 30 available types of Crucible stainless steel. Your nearby Crucible representative will be glad to give you more details. Or, for an over-all look at the many uses of stainless, write for "Making the Most of Stainless Steels in the Chemical Processing Industry." Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

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Bulletin >>>



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VISIBLE WEDGE

**The finest positive
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ever developed**

New STABILITY

Hamer **Visible Wedge Valves** are absolutely rigid. No line movement necessary to open or close valve.

New SIMPLICITY

"Full-view" wedge. One glance determines whether line is full open or full close.

New SAFETY

Operator has complete control of the wedge at all times. Wedge pivots—no hand lifting necessary.

New SURE-SEAL SHUT-OFF

Combining precision metal-to-metal fit of wedge and seats augmented by dependable seal rings, the new **Visible Wedge** provides the impenetrable sealing action of a Line Blind, yet maintains the simplicity of operation found in a gate valve.

The new Hamer **Visible Wedge** is available in Straightway, Tee, and Ell styles meeting all A.S.A. specifications.

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Representatives Throughout the World.

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ENGINEERING & MAINTENANCE

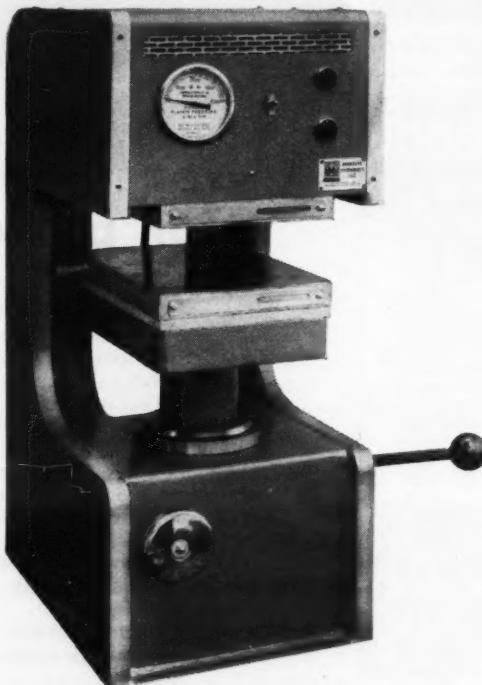
Nomographs on vacuum systems included in bulletin

Gas ballast theory and application to company's line of high vacuum pumps are given in 16-page, two-color catalog. Line drawings and photographs illustrate various pump models including vane-type, piston-type, compound, and combination units. Engineering data and specifications combine with nomographs to aid users in vacuum system design.

Bul P3 is issued by Naresco Equipment Corp., Sub., National Research Corp., Dept. CP, 160 Charlemont St., Newton Highlands 61, Mass. When inquiring specify CP 3884 on form opposite last page.

Designed for plastic and rubber industry, hydraulic press has cast-in cooling . . .

calrod heaters are individually controlled by thermoswitches to 600°F



Presses are rugged, compact, and neat in appearance

Uses: Molding rubber or plastic components by hydraulic pressure.

Features: Press has "C" frame designed for use in rubber and plastic industry. Precision ground platens have cast-in cooling coils.

**BASIC
FACTS**



FIG. 6061

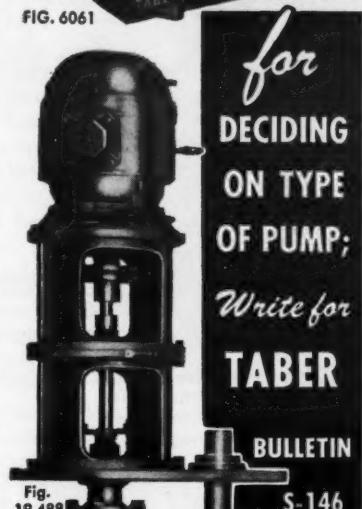


Fig. 19,488

for
**DECIDING
ON TYPE
OF PUMP;**

Write for

TABER

BULLETIN

S-146

**Practical
GUIDE TO
PUMP
SELECTION**

Big illustrations and brief descriptions with capacities and adaptability of pumps are contained in this unbiased compilation of facts to help avoid costly misapplication. Bulletin S-146.

TABER PUMP CO.
Est. 1859
320 Elm St.,
Buffalo 3,
N. Y.

TABER

When inquiring check CP 3885
opposite last page

CHEMICAL PROCESSING

Description: Calrod heaters individually controlled by thermostats to 600°F assure efficient and even temperatures. Units are rugged, compact, and neat in appearance. Two-stage hydraulic pump provides quick closing and produces maximum pressure with ease.

(Hydraulic presses are a product of Pasadena Hydraulics, Inc., Dept. CP, 273 N. Hill Ave., Pasadena, Calif. . . or for more information check CP 3886 on form opposite last page.)

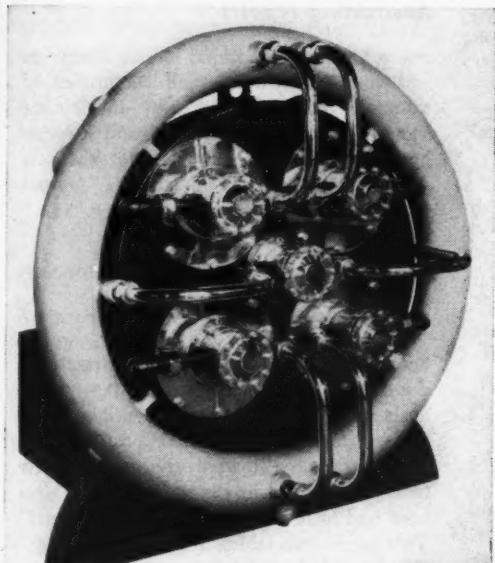
Operates nine hydraulic pumps with single prime mover . . .

multiple pump drive supplies 35 gpm to each

Uses: Pumping fluids for a number of pumps.

Features: Unit can handle nine different fluids through nine different pumps at individual capacities of 35 gpm at 1000 psi.

Description: Multiple pump drive employs a single prime mover, such as an electric motor or Diesel engine. Total output of 315 gpm can be directed to a single operation, or output from each of



Multiple pump drive can handle nine different fluids to nine different pumps

nine pumps can be piped to a different operation. Entire unit is compact and may be mounted on a truck for easy mobility. Any type hydraulic pump can be served, such as gear, rotor, vane, or rotor piston.

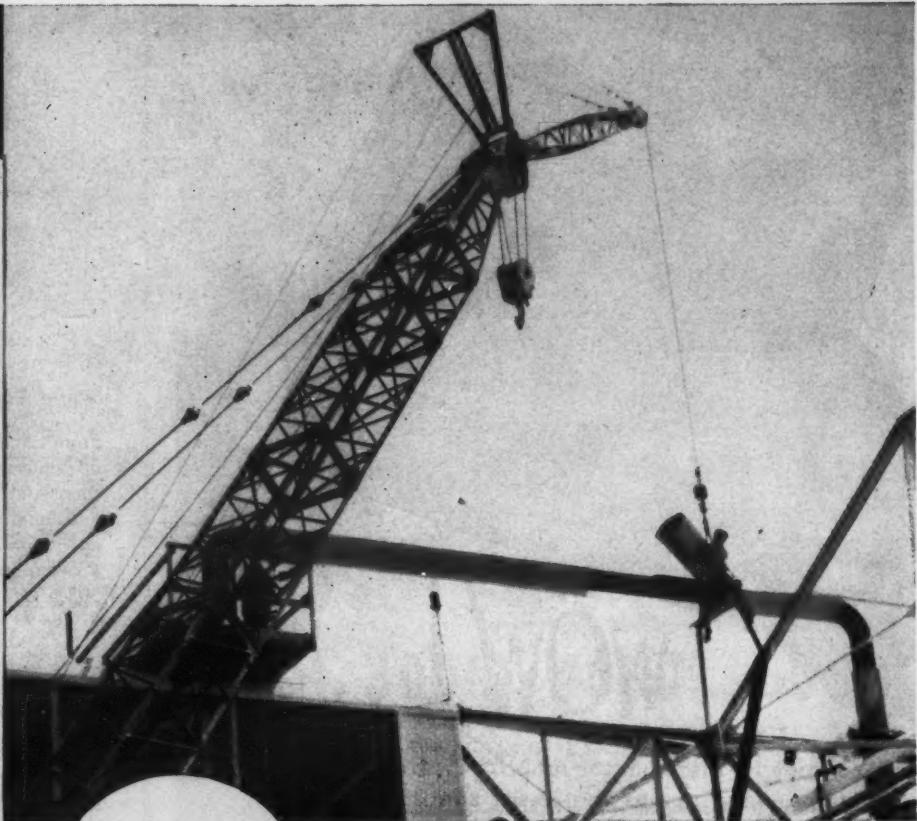
(Quinn multiple pump drive is a product of A-1 Iron and Metal Co., Dept. CP, 10,000 S. Alameda St., Southgate, Calif. . . or for more information check CP 3887 on form opposite last page.)



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See our catalog in
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Anyone can apply

SNAP*ON

anywhere!

Versatile is the word for G-B Snap*On, the new one-piece pipe insulation molded of fine glass fibers. Whether you need pipe insulation for hot or cold piping, in the plant or outside, in $\frac{3}{4}$ " to 36" sizes, Snap*On is the pipe covering for you. Anyone can handle this new lightweight and indestructible insulation . . . anyone can apply it by simply spreading the single seam and snapping the material over the pipe.

As the photo indicates, if you can put a man in contact with a run of pipe, he can quickly insulate it all by himself with Snap*On. The one-piece construction of Snap*On reduces labor cost of installation one-third, in

many cases. Waste is nil, even though plant workmen have never used the product before nor received any special training in its application.

If you can't say as much for your present pipe insulation, call your nearby Snap*On distributor whose phone number is shown in the adjoining column. He'll furnish you samples and complete technical data that will prove to you that for thermal efficiency, low-cost application, and permanence, there's nothing like G-B Snap*On. Call him today.

GUSTIN-BACON *Manufacturing Company*

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Molded glass fiber pipe insulation

254 W. 10th St., Kansas City, Mo.

When inquiring check CP 3888 opposite last page



You pay no premium for Ampco* Centrifugal Pumps — the pumps that resist corrosion, erosion, and are easily adapted to changing demand

First of all, you can get an Ampco Centrifugal Pump in any alloy you want, with high efficiencies, to give you the maximum resistance to corrosion and erosion your process requires.

You save on power too, because Ampco Pump efficiencies remain high under the most adverse conditions. There are no unstable curves in the Ampco Pump family.

And, if you're faced with changing demands, and you have to run your pump "off rating," an Ampco Pump will fulfill your conditions. You get a pump that saves you money — money on shaft breakage, bearing failures, seal breakage, fretting, etc.

Here's why! Ampco Centrifugal Pumps give you numerous combinations. You can get the exact shaft you need, including standard, heavy, extra-rigid and two-piece designs.

You can select the bearings you want — sealed, replenishable grease, or oil-lubricated, single and double widths.

You can choose your shaft seals — inside or outside mechanical seals; internal, external, or flushing-packed stuffing boxes.

You can pick the pedestal height and type of impeller you want.

And here's another saving — you don't have to buy a new pump when your conditions change. Thanks to the versatility of Ampco Centrifugal Pump design, you can make modifications in the field — quickly and inexpensively.

It pays to use Ampco Centrifugal Pumps in your tough spots. Speeds — 1750 and 3500 rpm. Capacities to 600 gpm. Heads to 300 ft. Write for latest literature.

*Reg. U. S. Pat. Off.



AMPCO METAL, INC.

Dept. CP-2

Milwaukee 46, Wisconsin
West Coast Plant • Burbank, California

When inquiring check CP 3889 opposite last page

briefs

from contemporary publications

Liquid-liquid extraction

From England come generalized descriptions of underlying principles of extractor design, and application of these principles to column extractors. A nomogram for hold-up is included. Five pages, two figures. ("Industrial Chemist," October, 1955, page 505.)

Trace copper

Mining engineers will be interested in a new, rapid, field method for the determination of small amounts of copper in soil and rock. Fusion of the sample with potassium bisulfate and estimation of copper with copper-selective biquinoline in isoamyl alcohol are employed. Confidence limits at the 95 per cent level are given. Two pages, two tables, one photograph. ("Engineering and Mining Journal," October, 1955, page 88.)

Tensile properties of yarns

Stress-strain properties of Fiberglas, viscose, acetate, nylon, Orlon, Dacron, Dynel, saran, polyvinyl chloride, and Kuralon yarns were determined with the Instron tensile tester. Work of rupture and recovery of tensile strength were also investigated. Sixteen pages, six tables, 10 figures, 12 references. ("Textile Research Journal," October, 1955, page 817.)

Abstracting reports

An experienced technical editor compares and contrasts abstracts and summaries of technical reports, shows why the author should write his own abstracts, and suggests how authoritative and reliable abstracts should be prepared. Two pages. ("Journal of Chemical Education," Oct '55, p. 532.)

Refrigeration

This survey of industrial refrigeration proceeds from elementary concepts and definitions to machines, applications, refrigerants, and selection of equipment. Properties of saturated ammonia and of Freon-12 are given. Twenty pages. ("Power," October, 1955, page 75.)

Electrochemistry

Seventh in a series of lessons in elementary chemistry for electroplaters, this paper deals with formulas, formula weights, and their determination. The expository material is slanted toward the requirements of those engaged in electroplating but who have had little formal training in chemistry. Two pages, two tables. ("Metal Finishing," October, 1955, page 62.)

Fractionation of radium-barium

Precipitation of the chromates of barium and radium offers advantages over the crystallization method for the enrichment of radium from the standpoints of control, speed, and simplicity. Five pages, four tables, three figures, 18 references. ("Industrial and Engineering Chemistry," October, 1955, page 2162.)

Heat transfer

Part 2 of a four-part series concerned with design of heat exchangers covers heat transfer coefficients and presents pertinent equations, plots, and nomographs. Ten pages, 12 figures. ("Petroleum Refiner," October, 1955, page 129.)

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Maintenance standards

Management consultants discuss simple standards for maintenance and answer the questions: "How much do they cost?", "How do they work?", "Can they be used profitably?", "Can a small plant benefit from use of these standards?". Sample data sheets are included. Seven pages, eight tables. ("Plant Engineering," October, 1955, page 87.)

Rating condensers

A simple method for rating water-cooled condensers shows graphically the effect of different variables for given types of refrigerants, tubes, and fouling conditions. Varying water flow rates are considered. Eight pages, eight figures, three references. ("Refrigerating Engineering," October, 1955, page 52.)

Petroleum detergency

Research on detergents for petroleum displacement includes surface-tension tests, cloud-point determinations, and displacement tests with Ottawa sand. Tables of displacement efficiencies and properties of detergents are given. Six pages, two tables, 20 references. ("Soap," October, 1955, page 41.)

Thermal conductivity of liquids

Newly designed and extensively tested apparatus was used to determine thermal conductivities and temperature coefficients of 53 pure organic liquids. A method of correlation and equations for normal and associated liquids is given. Fourteen pages, six tables, four figures, six references. ("A.I.Ch. E. Journal," Nov. 1955, page 275.)

House organs

A plant publications man from DuPont shows how a plant paper, dedicated to worthwhile service rather than to trivial gossip, can be made to earn its keep. Interesting illustrations are employed. Three pages. ("Factory," Oct 1955, page 138.)

Brightness meter

Brightness ratios, to be used in model studies of buildings, are determined through use of a new meter that includes a collimating device and a barrier layer cell. Two pages, two figures, five references. ("Illuminating Engineering," Nov 1955, p. 543.)

Liquid-liquid extraction

From England come analyses of differential contact and plate columns as part of a discussion of design of liquid-liquid extraction equipment. Eight pages, one table, six figures, 68 references. ("Industrial Chemist," November 1955, page 552.)

Explosive mists

Chemical compositions and heats of vaporization mean more than flash points in judging hazards of mists of combustible liquids. Quenching of mists is discussed. Three pages, two tables, two figures, 13 references. ("Petroleum Refiner," November 1955, page 194.)

Electrical fires

Eight ways of reducing temperatures in electrical devices serve to aid in preventing fires from electrical causes. Five pages, five figures. ("Product Engineering," November 1955, page 145.)

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Heavy Duty stainless pipe fittings when high pressure, temperature and corrosive conditions require their use.

2000#, 3000#, 4000# and 6000# Screwed and Socketweld Fittings

In addition to manufacturing a complete line of 150 lb. stainless steel screwed fittings CAMCO can supply your requirements in pressure rated heavy duty stainless steel pipe fittings. Most of the popular sizes and items are available from stock in types 304, 304ELC, 316 and 316 ELC stainless steel screwed and socketweld fittings. Wide reinforcing bands insure maximum strength at points of stress and extend well beyond the last thread or depth of socket. All fittings permanently identified with size, alloy, pressure rating, heat code and trademark.



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NORTH HAVEN, CONN.

When inquiring check CP 3890 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

Technical paper presents data on stress corrosion

Reprint of fourteen-page technical paper on stress corrosion cracking of hardenable stainless steels presents valuable information that will be of interest to corrosion engineers faced with this problem. Tempering and quenching methods for minimizing stresses likely to cause corrosion cracking are suggested.

Technical paper, "Stress Corrosion Cracking of Hardenable Stainless Steels," was published in Corrosion, Vol 11, No. 8, Aug. 1955. Paper was prepared by F. K. Bloom, Armco Steel Corp., Dept. CP, 700 Curtis St., Middletown, Ohio. Specify CP 3891 on form opposite last page.

Catalogs industrial, agricultural, and pharmaceutical chemicals

Properties and general use information on more than 350 basic industrial, agricultural, and pharmaceutical chemicals is covered in 36-page catalog. Among the groups are plastics, coating materials, magnesium, titanium, glycol ethers, ion exchange resins, heat transfer media, flotation and flocculating agents, amino acids, organic chelating agents, and various methylcellulose products.

"Products of The Dow Chemical Company 1955-56" is issued by Technical Service and Development, The Dow Chemical Company, 1000 Main St., Midland, Mich. Check 3892 opp. last page.

Literature on linings and coatings

Three bulletins describe manufacturer's plastic lining, a custom-coating process, and a modified epoxy plastic coating. Four-page bulletin on plastic lining points out its applications, describes how it may be used to prevent corrosion damage and paraffin deposition. Case histories are also included.

Two-page bulletin on custom coatings explains

how specialty items can be protected against corrosion, contamination, and sticking. One-page circular on modified epoxy coating describes what can be expected of the material and tells why it is practical for use on tubular goods and other applications.

Three bulletins are available from Tube-Kote, Inc., Dept. CP, P.O. Box 20037, Houston 25, Tex. Specify CP 3893 opposite last page.

Describes accurate sizing of granular materials

Four-page bulletin illustrates and describes sizing equipment which is being used to advantage in chemical applications. Form G-2 is issued by Hart-Carter Co., Dept. CP, 655 Nineteenth Ave., N.E., Minneapolis 18, Minn. When inquiring specify CP 3894 on form opposite last page.



"It says, Gross weight 17,586 pounds—You are warm and generous to a fault, but you are often remiss in attending to detail."

Lists dyes, resin-bonded pigments, and textile chemical specialties

A compendium of American dyes, resin-bonded pigments, and textile chemical specialties (adhesives, emulsifying agents and assistants, finished agents and assistants, fugitive stains, to name a few) and their manufacturers cover 238 of manual's 624 pages. Another 94 pages are devoted to AATCC methods for testing textiles. Remainder of book covers organization, reports of committees, and membership of the association.

To obtain "1955 Technical Manual and Year Book of the AATCC" remit \$6.00 direct to Dr. H. C. Chapin, Secretary, American Institute of Textile Chemists and Colorists, Lowell Technological Institute, Lowell, Mass.

Eleven ways to avoid boiler tube corrosion

Eight-page folder contains important data resulting from an extensive study of the causes of boiler tube corrosion. Many of the causes of corrosion in boiler tubes are explained in detail, along with eleven suggested methods of eliminating these causes.

Bul TR-537 is issued by Tubular Products Div., The Babcock & Wilcox Co., Dept. CP, 161 E. 42nd St., New York, N. Y. When inquiring specify CP 3895 on form opposite last page.

Study of epoxy resins for casting

Detailed studies of semi-rigid epoxy resins for casting are presented in two bulletins. In practically all cases, full age hardening occurred within two to three days at 150°F.

Bulletins on casting resins are issued by Furane Plastics Inc., Dept. CP, 4516 Brazil St., Los Angeles 39, Calif. When inquiring specify CP 3896 on form opposite last page.

**Covers sun screening agent,
non-discoloring antioxidant**

Pleasant smelling, solid crystalline diether which finds application as a sun screening agent, para dimethoxy benzene; and a colorless flaky solid useful as a non-discoloring antioxidant and stabilizer for plastics and rubber, para hydroxy anisole, are covered in 16-page, two color booklet. Included are physical properties, infra-red and UV spectra, specifications, chemical properties, toxicity, suggested uses and shipping information.

"H. A., D.N.B. Chemical Products Bulletin" is issued by Ansul Chemical Co., Dept. CP, Marinette, Wis. Specify CP 3897 opposite last page.

**Series of nonionic surface-actives
has wide range of properties**

Recommended for uses in the agricultural chemical, textile processing, sanitary, leather, rubber, paper, and metal cleaning fields, Triton nonionic surface-active agents range in solubility and viscosity characteristics and physical properties. The agents are made by reaction of *t*-octylphenol with ethylene oxide. In addition to comparing properties in numerous tables and graphs, the 20-page booklet describes toxicity, analytical methods, and suggested applications.

Bul SP-59 is issued by Special Products Dept., Rohm & Haas Co., Dept. CP, Wash. Square, Philadelphia 5, Pa. Specify CP 3898 opp. last page.

**Describes colorimeter
for lab**

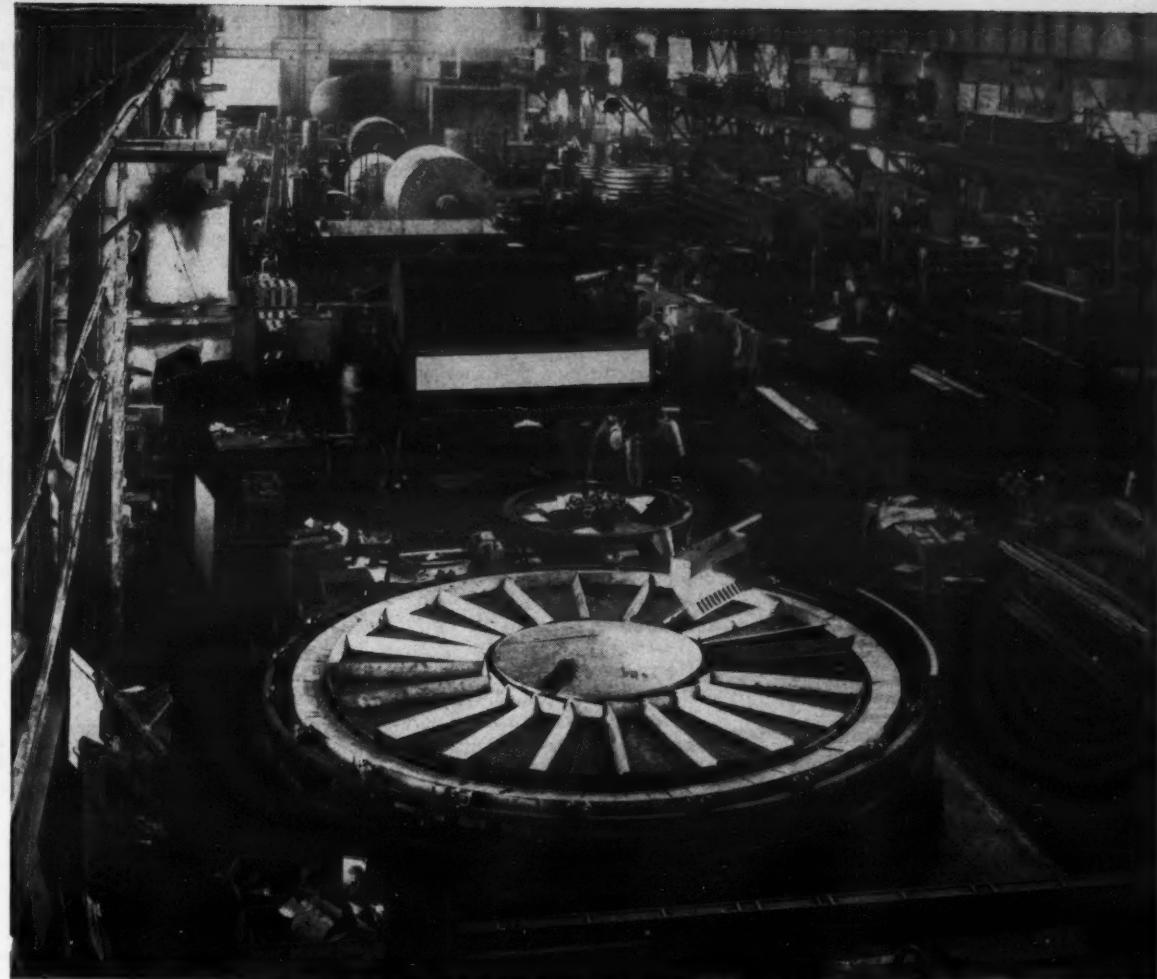
Supplementing previous catalog of manufacturer, 16-page booklet illustrates and describes equipment for the laboratory. Instruments described: a sugar colorimeter, magnetic stirring hotplate, portable cooling unit, torsion balances, vacuum pump.

"What's New" No. 24 is issued by Scientific Glass Apparatus Co., Inc., Dept. CP, 100 Lakewood Terrace, Bloomfield, N. J. When inquiring specify CP 3899 on form opposite last page.

**"How to pack it"
in corrugated**

Booklet of 32-pages describes more than 75 designs of corrugated boxes. Information is given on special corrugated box design, developed for specialized product requirements. Basic corrugated box designs are also described and illustrated.

"How to Pack It" is issued by Hinde & Dauch Paper Co., Dept. CP, 407 Decatur Street, Sandusky, Ohio. Specify CP 3900 opp. last page.



View of assembly bay Eimco Filter Division. In the foreground is shown 120 sq. ft. pan filter, all stainless steel construction for phosphoric acid.

SPECIFY EIMCO FILTERS FOR GUARANTEED PERFORMANCE

Eimco filters are built to meet the exacting requirements of process engineers all over the world.

The wide range in types of filters available at EIMCO include both vacuum and pressure designs in: Drums, Discs, Agidiscs, Top Feed, Dewaterers and Dryers, Pans, Tubular elements and Plate and frames. Each of these designs is available with numerous attachments for cake

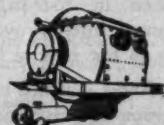
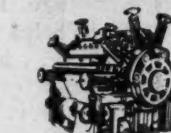
dewatering and cake removal. Materials of construction are selected with regard to the material to be filtered.

Every filter job receives individual attention at Eimco. The Eimco filter delivered in your plant provides you with the finest filtration equipment you can buy at any price and with a machine guaranteed to perform on your product.

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B-178

When inquiring check CP 3901 opposite last page

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The BETTER the ODOR
the BIGGER the SALES!



SO ALIKE, YET SO DIFFERENT

They look alike and each performs the same function equally well, but they *smell* and *sell* differently. In one, basic constituents give the finished product a noticeably unpleasant odor; in the other a specially developed industrial odorant has been added to mask the natural ingredients and to impart a pleasanter, more attractive scent. Sales of the latter far exceed the original product in popular demand, indicating the importance, psychologically, of odor in the field of consumer sales. Perhaps our Industrial Odorant Division can help make your product more salable through the use of a pleasant masking odor.

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When inquiring check CP 3902
opposite last page

NEW LITERATURE

Advantages of self-priming chemical pumps

Advantages of recently-introduced line of self-priming centrifugal pumps are covered in eight-page bulletin. Removable recirculation port provides smaller suction and discharge chambers and a faster prime. Units described are particularly designed for chemical sumps, tank car unloading, and underground tanks. Back page of bulletin gives typical physical properties and information on the corrosion resistance of Worthite, an alloy steel used in the construction of the pumps.

Bul W-350-B13 is issued by Worthington Corp., Dept. CP, Harrison, N.J. When inquiring specify CP 3903 on form opposite last page.

Filter selection procedure described in catalog

Heavy-duty, pressure leaf filters are described in six-page catalog. Chapter on filter selection lists eight factors to be taken into consideration when selecting a filter. Catalog also covers various types of leaves, materials of construction, code design, quick-opening covers, and other features available.

Cat HVP-55 is issued by American Plant Equipment Co., Dept. CP, 701 Spring St., Elizabeth 4, N.J. Specify CP 3904 opposite last page.

Castable block insulation features tabulated

Outstanding features of lightweight castable block insulation are tabulated in two-page data sheet. Recommended applications are presented together with charts and graphs listing thermal conductivity, heat loss, physical characteristics.

Bul 215 is issued by J. H. France Refractories Co., Dept. CP, 1944 France Road, Snow Shoe, Pa. Specify CP 3905 opp. last page.

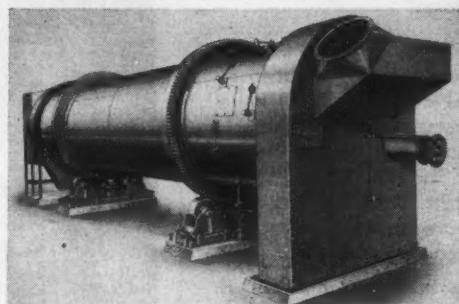
Tells how to stop dust problem at source

How to stop dust nuisance problems at source by the use of self-contained dust collectors is explained in four-page bulletin. Units can be mounted directly over bins, chutes, or hoppers, and do not require long ducts or pipes.

Bul 70-G1 is issued by Omega Machine Company, Division of B-I-F Industries, Inc., Dept. CP, 345 Harris Avenue, Providence, R. I. When inquiring specify CP 3906 on form opposite last page.

DAVENPORT ROTARY

HOT AIR DRYER 6'0" dia. x 25'0" long



DAVENPORT
PRESSING - DRYING
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COOLING Equipment
Continuous DeWatering
Presses
ROTARY DRYERS
Steam Tube, Hot Air
and Direct Fire
Atmospheric
DRUM DRYERS
ROTARY COOLERS
Water and Air

Cereal Process Drying

This "Davenport" Rotary Hot Air Dryer is of stainless steel construction. Dryer is installed in one of the large processing plants, drying wheat gluten.

Let our engineers consult with you on your Pressing, Drying, and Cooling problems. Send for complete Catalog C or for quick reference, consult your *Chemical Engineering Catalog*, 1954 or 1955.

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FOUNDRY COMPANY

When inquiring check CP 3907 opposite last page

alphabetical
index
on
page 222



... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 222. "Quick-locator" starting on that page was a feature in *CHEMICAL PROCESSING* years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want ... in a hurry!

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When inquiring check CP 3908 opposite last page

HOW TO CUT PIPING LAYOUT COSTS



Save Time, Material and Labor with NAYLOR Fabrication Service

By combining several fittings into one integral unit and eliminating numerous flanged joints, Naylor fabrications enable you to save money and obtain better performance on your piping layouts. All types of materials can be fabricated accurately to your specifications. Sizes range from 3" to 44" in diameter and wall thicknesses from 14 gauge to $\frac{3}{8}$ ". Complete line of standard fittings for lightweight pipe also available.

For the complete story,
write for Bulletin No. 525

**NAYLOR
PIPE**



NAYLOR PIPE COMPANY
1260 East 92nd Street
Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

When inquiring check CP 3909 opposite last page

NEW LITERATURE

Describes design, uses of precipitators

Applications, operation, and design features of precipitators are listed in 20-page bulletin. Complete with flow diagrams and photographs, the literature should be of interest to all engineers dealing with water, its reuse, conservation, etc.

Bul No. 2204C is issued by The Permutit Company, Dept. CP, 330 West 42nd Street, New York 36, N.Y. When inquiring specify CP 3910 on form opposite last page.

Inner-fins featured on heat exchangers

Described as a basic new concept in heat transfer engineering, four-page bulletin covers finned heat exchangers having an arrangement of longitudinal fins inside tubes in conjunction with outer fins. Engineering data and general application information about the equipment are included.

Bul 850 is issued by Bush Manufacturing Co., Dept. CP, South Street and Railroad, West Hartford, Conn. When inquiring specify CP 3911 on form opposite last page.

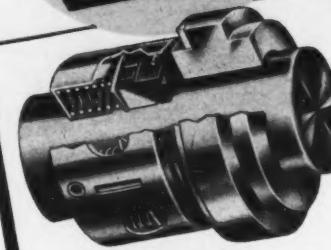
Electroplating chemicals

Pocket-sized foldout bulletin describes twenty series of manufacturer's special products for the metal finishing industry. Products described cover blackening of all metals, alkaline cleaners, stripping compounds, water displacing compounds, products for treating aluminum, alkaline solutions for rust removal, and protective compounds for iron and steel.

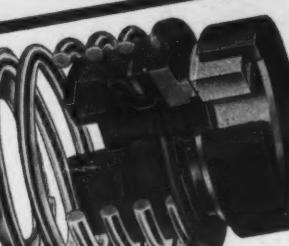
Form No. 16599 is issued by Enthone, Inc., Dept. CP, 442 Elm St., New Haven, Conn. When inquiring check CP 3912 opposite last page.

Reduce your liquid handling costs!

*Install
JOHN CRANE*



TYPE 9
EXPENSIVE CHEMICALS
CORROSIVES
FLAMMABLE LIQUIDS
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TYPES 1 and 2
ALCOHOLS
GENERAL CHEMICALS
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MECHANICAL SEALS

There is no better way to cut liquid handling costs than with "John Crane" Seals. They are specially engineered for the Chemical Industry to provide these important operational savings:

- 1 Eliminating loss of expensive and corrosive fluids.
- 2 Positive sealing of toxics, thus minimizing need for costly exhaust equipment.
- 3 Substantially reduced maintenance and the man-hours involved.
- 4 Reduction of "shutdown periods" due to materially increased service-life expectancy over and above your present methods.

Ranging from the Types 1 and 2 (for services where synthetic rubber is suitable) to the Type 9 (with sealing members made of DuPont Teflon to handle any industrial chemical or corrosive) . . . there is a "John Crane" Seal that can be adapted to your individual conditions.

remember: Your toughest problem can be
"John Crane's" next success story.

Don't wait, call us now. Get our seal catalog

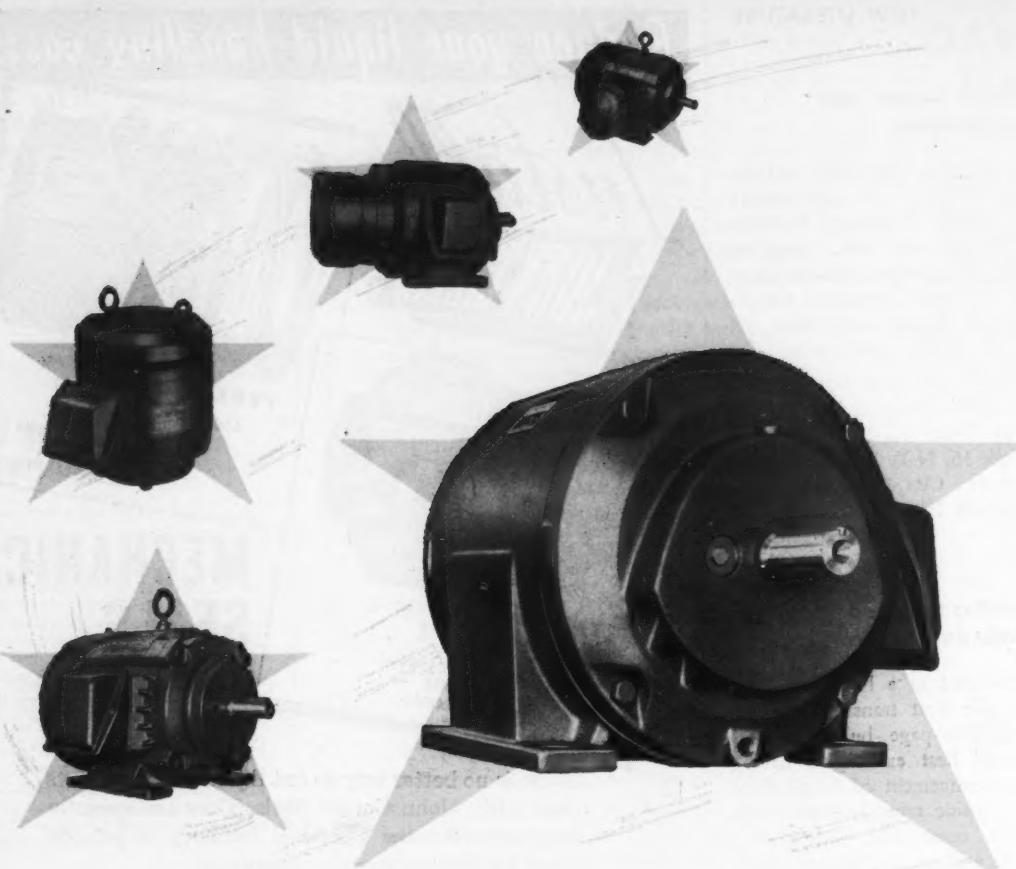


Crane Packing Co., 6421 Oakton St., Morton Grove,
Illinois (Chicago Suburb).

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When inquiring check CP 3913 opposite last page



NEW Totally Protected MOTORS NOW AVAILABLE

Complete line of the NEW Reliance Totally Protected A-c. Motors is IMMEDIATELY available.

These star performers combine maximum physical strength and protective enclosure. Starting and full load torques in excess of NEMA standards . . . built-in reserves to meet extra production loads.

Mount the new compact NEMA Frames where ever you have an application for an a-c. motor

of 1 to 40 horsepower. All types of mountings . . . frame sizes 182 to 326-S.

Reliance Motors are *totally protected from core to cover . . .* rotating components and active material are carefully treated and assembled to assure a lifetime of trouble-free continuous performance.

Let us put these star performers to work for you—write for complete information.

B-1103

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When inquiring check CP 3914 opposite last page

NEW LITERATURE

Method for close-tolerance stainless castings

Ceramicast process for producing close-tolerance stainless castings as well as castings of steel and a variety of corrosion-resistant alloys is described in four-page bulletin. Process, which was recently placed in operation at the company, produces castings which have excellent surface smoothness, high dimensional accuracy, and freedom from sand or gas inclusions.

Bul on Ceramicast process is issued by Lebanon Steel Foundry, Dept. CP, Lebanon, Pa. When inquiring specify CP 3915 opposite last page.

Collection of technical papers on synthetic rubber program

Complete collection of technical papers from Government Synthetic Rubber Program is available. The 3750 reports, covering period February 1, 1943 through June 30, 1954 are available on microfilm or photocopy and may be obtained from Photoduplication Service, Publication Board Project, Library of Congress, Washington 25, D.C. Papers are identified as PB 118310. Prices are quoted on request.

Also available is a four-volume compilation of abstracts from the program, identified as PB 111736. It is available from Office of Technical Services, US Dept. of Commerce, Washington 25, D.C. at \$5 a set.

Literature on lubricated plug valves

Illustrated, 28-page bulletin gives complete information on manufacturer's line of lubricated plug valves. In one section eighteen features of these units are pointed out.

Bul RB39-5 is issued by Homestead Valve Manufacturing Co., Dept. CP, Coraopolis, Pa. When inquiring specify CP 3916 opposite last page.

Fired indirect heater installations

Eight-page bulletin illustrates and describes a number of actual installations of fired indirect heaters. Units are used for heating air, corrosive gases, thermal chemicals, circulating oils, asphalt, and other products.

Bul 551 is issued by Brown Fintube Co., Dept. CP, 150 Huron St., Elyria, Ohio. When inquiring specify CP 3917 on form opposite last page.

NEW LITERATURE

For the corrosion engineer — data on zirconium

Valuable information on zirconium, which will be of interest to corrosion engineers, is contained in four-page publication. Corrosion resistance, mechanical properties, and fabricability of the metal are included.

Bul 495 is issued by Carborundum Metals Co., Inc., Subsidiary of the Carborundum Co., Dept. CP, Akron, N.Y. When inquiring specify CP 3918 on form opposite last page.

Describes vapor fractometer for gas analysis

Six-page bulletin describes instrument for analysis of gases and liquids boiling below 300°C. Description of vapor fractometer components includes block diagram. Uses suggested for the instrument include qualitative, quantitative and trace analyses.

Model 154 Vapor Fractometer is issued by The Perkin-Elmer Corp., Dept. CP, 2135 Summer St., Stamford, Conn. When inquiring specify CP 3919 on form opposite last page.

Design, selection of thermocouples covered in bulletin series

Series of engineering bulletins, totaling fourteen pages, covers design and selection of thermocouples for liquid, gas, and surface temperature measurements. Outline drawings of standard units, information on conductors, junctions, tubes, and other engineering data are used to illustrate construction and application features of units.

Buls 1601, 1602, 1603, and 1604 are issued by Revere Corporation of America, Dept. CP, Wallingford, Conn. When inquiring specify CP 3920 on form opposite last page.

High-temperature characteristics of grease given

Characteristics of high melting point, short-fibered grease for use at temperatures up to 250°F are presented in data sheet. Characteristics discussed include heat resistance, feeding characteristics, antirust properties, and stability. Bulletin includes time-temperature chart showing grease life at various operating temperatures.

Bul 40 is available from Sun Oil Co., Dept. CP, 1608 Walnut St., Philadelphia, Pa. When inquiring specify CP 3921 on form opposite last page.

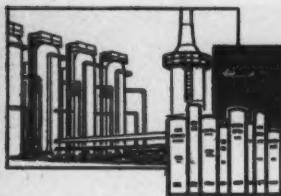
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Ideal for pocket,
tool box or
desk drawer. Ask for
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Valve & Fitting Division

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When inquiring check CP 3922 opposite last page



processing and engineering data

144a

Pressure Drop and Flow Velocity in Dowtherm Piping

Nomograph and information from
THE DOW CHEMICAL COMPANY'S "Dowtherm Handbook"

Recently made available, handbook provides Dowtherm-data gathered by Dow Chemical since 1932. Some of the data has been reduced to nomographs of which "Pressure Drop" is an example. Nomograph can be used to calculate quickly the velocity in ft/sec or pressure drop in psi/100 ft of pipe for Dowtherm vapor using either actual inside diameter of piping or nominal pipe size. Nomograph has been calculated for both Dowtherm A and E.

Typical Example

Flow of Dowtherm A vapor at 700°F in an 8" pipe is 120,000 lb/hr. What is the pressure drop in psi/100 ft and what is the velocity in ft/sec?

Connect 8 on pipe size scale with 120,000 lb/hr. Note intersection of straightedge with reference line B. Connect point on B with 700°F on Dowtherm temperature scale to left of Flow scale. Read pressure drop of 1.20 psi/100 ft on Pressure Drop scale at far right.

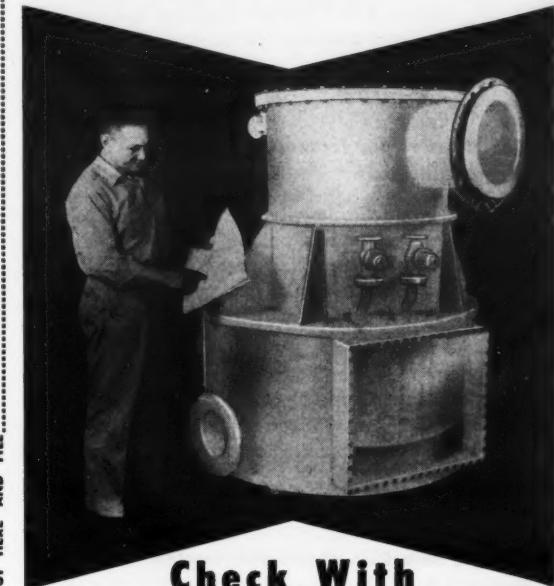
For velocity in ft/sec, connect intersection of straightedge with reference line α with 700°F on Dowtherm temperature scale to right of Flow scale. Read velocity of 59 ft/sec on Velocity scale to far right.

In addition to numerous tables on Dowtherm chemical, physical, and thermodynamic properties, booklet includes information on equipment that has proven satisfactory in service. Appendix of the 84 page booklet includes tables of heat transfer coefficient equivalents, thermal conductivity, heat loss, conversions.

Dow Handbook is issued by The Dow Chemical Company, Dept. CP, Midland, Michigan. When inquiring check 3923 on form opposite last page.

(Please turn to page 210)

For Low Cost
Corrosion Resistant And
Maintenance Free
Fabrications And
Plastic Components
To Your Specifications



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■ As specialists in the field of structural plastics, anti-corrosion materials and methods, American Agile has perfected through many years of research and development new processes and applications for plastics.

American Agile...first introduced the spraying and forming of structural shapes from Polyethylene... first to commercially weld Plastics and first to commercially introduce irradiated Polyethylene molded parts. It will pay you to check with American Agile whenever you need fabrications or components that give you these advantages:

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When inquiring check CP 3924 opposite last page

CHEMICAL PROCESSING

**How costs are reduced
by wire construction**

Uses of wire in improved product design are subject of 12-page illustrated study. Illustrated case histories cover applications in motor mounting, fans, and building specialties. Specific cost savings in various applications given by reduced weight, simplified design, improved appearance, and noise and vibration reduction are listed in each case.

"How Wire Construction Reduces Costs" is available on letterhead request from E. H. Titchener & Co., Dept. CP, 67 Clinton St., Binghamton, N.Y.

**Pictures heaters, burners,
specialized equipment**

Photographs, diagrams, and drawings of industrial heating equipment are highlights of eight-page bulletin. In addition to outlining company's products and services, literature describes applications of high velocity combustion techniques. List of over 40 users of equipment is included.

Bul 108 is issued by Thermal Research & Engineering Corp., Dept. CP, Conshohocken, Pa. Specify CP 3925 opposite last page.

**Double filtration area, volume
provided by filters**

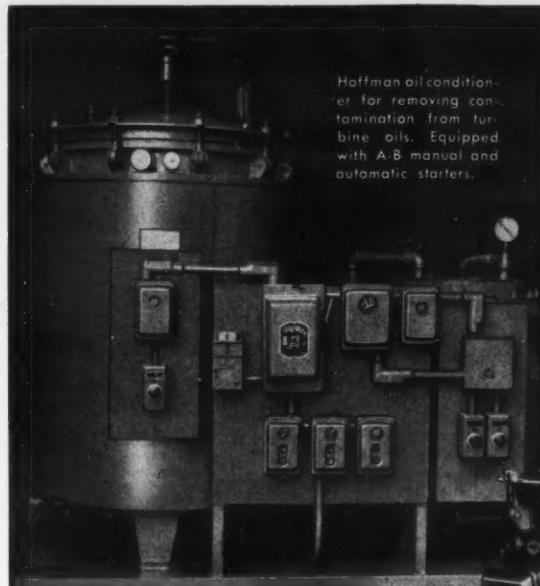
Double-duty filters for use in electroplating, chemical processing, and other industries are discussed in four-page booklet. Units use filtration principle which provides double filtration area and volume. Specifications are listed for various models.

Cat "Double Duty Filters" is issued by Bart-Messing Corp., Dept. CP, 229 Main St., Belleville 9, N. J. Specify CP 3926 opp. last page.

**How to use formed foam
in packaging**

Illustrated folder shows several views of a formed styrene foam used for packaging delicate objects. Literature points out that US Post Office has accepted this container for shipments of bottles of liquid without absorbent wadding.

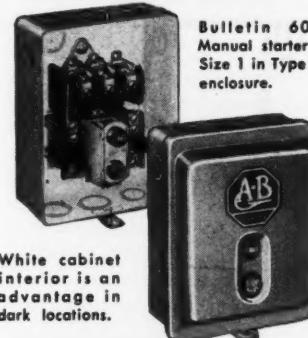
"A New Concept in Packaging" is issued by Ambassador Plastics & Mfg. Corp., Dept. CP, 620 N. Michigan Ave., Chicago 11, Ill. When inquiring specify CP 3927 opposite last page.



Hoffman oil conditioner for removing contamination from turbine oils. Equipped with A-B manual and automatic starters.



**The Sign of
QUALITY
MOTOR CONTROL**



Bulletin 609
Manual starter—
Size 1 in Type 1
enclosure.



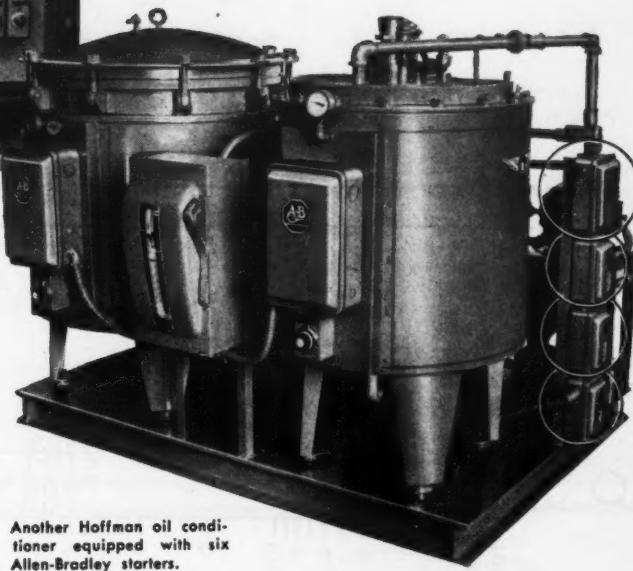
Bulletin 709 Automatic starter—Size 1
in Type 1 enclosure.

These starters are
available in various
types of enclosures
to satisfy any operating
condition.

Add a Valuable Sales Asset

to your motorized machines

Use
Allen-Bradley Motor Controls



Another Hoffman oil conditioner equipped with six Allen-Bradley starters.

You will benefit from easier and also added sales when you take advantage of the world-wide recognition of the A-B trademark as The Sign of QUALITY Motor Controls. Their simple design is a guarantee of trouble free operation.

Bulletin 609 manual starters . . . the most popular manual starters on the market . . . operate with a quick-make, quick-break action. Overload breakers reliably protect the motor against burnouts due to overloads.

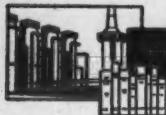
Bulletin 709 automatic solenoid starters have established their reputation for millions of trouble free operations.

All starters have double break, cadmium silver contacts which require no cleaning or dressing. Only ONE MOVING PART assures reliable operation. The overload relays do not change with time or operating conditions. It will be to your advantage to give your customers the benefit of such QUALITY control.

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
QUALITY

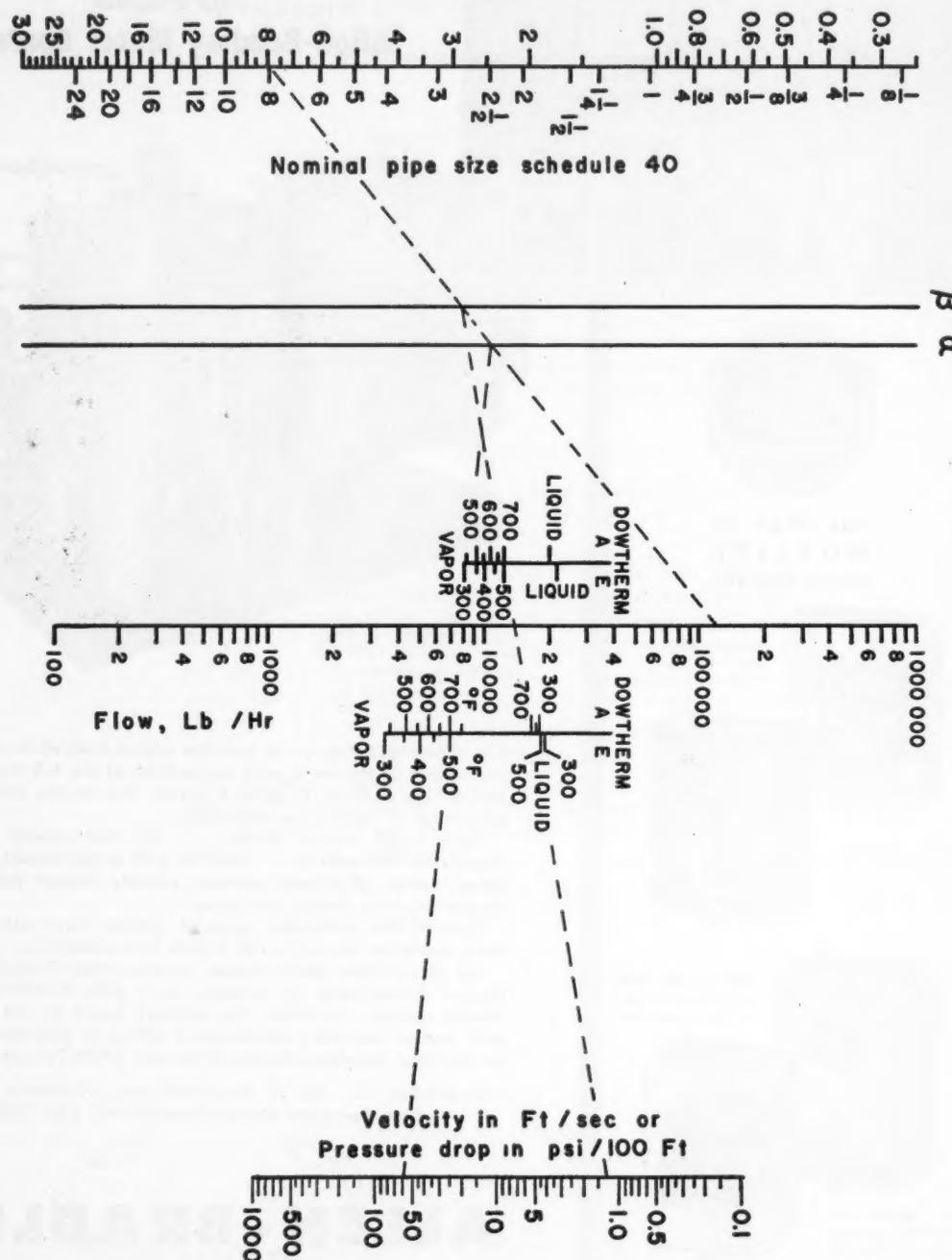
When inquiring check CP 3928 opposite last page



(Continued from page 208)

Pressure Drop and Flow Velocity in Dowtherm Piping

Actual inside diameter, Inches



CUT HERE AND FILE

- **THEY'RE** Versatile—built for use with motors of any make, any type, any age.
- **Easily Installed**—no special shafts or shaft extensions needed. Also come with exclusive tapered hub construction.
- **Made in two ratios**—13:1 and 20:1—for speeds from 5 to 154 R.P.M. and seven sizes from $\frac{1}{4}$ to 42 H.P.
- **Equal efficiency** on either horizontal or vertical mountings.
- **Precision-Built**—Shaft-Kings are built from components made on equipment chosen solely for this purpose, using techniques unsurpassed anywhere . . . comply with A.G.M.A. standards throughout.
- **Shaft-Mounted**—no special supports or foundations needed; space is saved.
- **Proven Performance**—over 100,000 American Speed-Reduction Drives are in use in every industry, in thousands of companies, large and small, throughout the world.
- **Immediately Available**—from distributor stocks everywhere.

In other words, American Shaft-King gives you
POWER AT THE SPEED YOU NEED
Write today for complete catalog including selection tables.

The American Pulley Company
POWER-TRANSMISSION DIVISION
4222 Wissahickon Ave. • Phila. 29, Pa.

When inquiring check CP 3929 opposite last page

NEW LITERATURE

Discusses methods, machines used in ore tests

Besides discussing methods and machines used in ore tests, 76-page catalog describes 146 laboratory instruments for ore testing. Photographs are used, where possible, to supplement each description. Booklet includes a brief index of ores tested in manufacturer's laboratory. Equipment is suggested for an amalgamation testing laboratory, for gravity concentration, flotation testing and for a cyanidation testing laboratory.

Catalog LG3-B10 is issued by Denver Equipment Co., Dept. CP, P. O. Box 5268, Denver 17, Colorado. Specify CP 3930 opp. last page.

Index to literature on instruments

Index of manufacturer's literature on instrumentation is 8½ x 11", 24 pages. Literature covered includes bulletins and catalogs, specification sheets, instrumentation data sheets, engineering and research bulletins dealing with specific instrument problems. Booklet is indexed by general subject, product, and industry. Educational aids available are also suggested.

Literature Index Bul 100-D is issued by Industrial Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne & Windrim Aves., Philadelphia 44, Penna. Specify CP 3931 opp. last page.

Cutting, threading, and grooving equipment catalog

Revised eight-page catalog presents manufacturer's line of threading, cutting, and grooving equipment. Line of geared pipe cutters and strippers for saran pipe, new additions to company's offerings, are described.

Quick-reference catalog is issued by Beaver Pipe Tools, Inc., Dept. CP, 300-500 Dana Ave., Warren, Ohio. Specify CP 3932 opp. last page.

Describes five materials that resist corrosion

Five materials of construction — porcelain, stoneware, coatings, graphite, and alumina — which have high resistance to corrosion are covered in 16-page bulletin. Variety of processing equipment produced from the various materials is shown and described.

Bul CHE-R5 is issued by General Ceramics Corp., Dept. CP, Keasbey, N.J. When inquiring specify CP 3933 on form opposite last page.

9,121

ways to valve corrosive substances with **HILLS-McCANNA valves**

36

BONNET ASSEMBLIES

- HANDWHEEL OPERATED—13 types including models with indicators, auxiliary handles, enameled bonnet and outside stem and yoke.
- QUICK OPENING—2 lever operated models go from full open to full closed in a 180° turn.
- SLIDING STEM—5 models to permit adaptation to a wide variety of operators.
- EXTENDED STEM—2 models provide easier operation in difficult locations.
- CHAINWHEEL OPERATED—1 model.
- AIR OPERATED—9 models offered with a choice of air cylinder or diaphragm motor operators.
- UNBALANCED HYDRAULIC OR PNEUMATIC—1 model utilizing pressure on valve diaphragm to close, line pressure to open.
- MOTOR OPERATED—3 models providing a choice of electric motor operators.

14

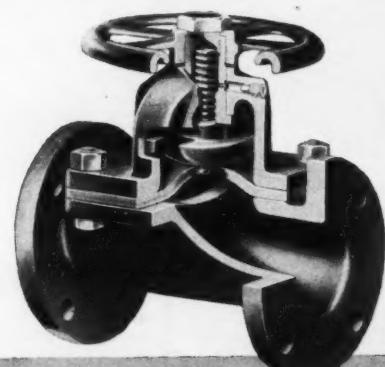
DIAPHRAGMS

- RUBBER—3 types including high acid/alkaline resistant, abrasion resistant and temperature resistant.
- NEOPRENE—5 types including acid, alkaline, oil and heat resistant formulations, freeze resistant and white, noncontaminating formulations.
- HYCAR—acid, oil and heat resistant.
- TYGON—acid resistant.
- COMPAR—solvent resistant.
- KEL-F—acid resistant.
- POLYETHYLENE—acid resistant.
- TEFLON—maximum chemical resistance.

27

BODIES

- CAST IRON—ASTM Class 3 minimum.
- CAST STEEL—standard foundry finish.
- CAST IRON, LINED—choice of 8 linings including hard or soft rubber, neoprene, glass, lead, Saran and Lithcote.
- CAST IRON, COATED—Stalpic coated.
- ALLOY—choice of 10 alloys including several types of stainless steel, Durimet, Everdur, Monel and Hastelloy.
- ALUMINUM—Cast.
- NICKEL—97%+ pure.
- PLASTIC—Choice of 4 materials: polyvinyl chloride, Uscolite, Saran or polyethylene.



HILLS-McCANNA...

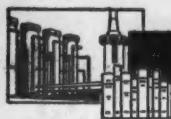
Corrosion Specialists
Since 1870

HILLS-McCANNA CO.

2370 W. Nelson St. Chicago 18, Illinois

Manufacturers of: Saunders Patent Diaphragm Valves • Chemical Metering and Proportioning Pumps • Force Feed Lubricators • Light Alloy Castings

When inquiring check CP 3934 opposite last page



Viscosities of Acrylic Monomers

BY D. S. DAVIS

Professor of Chemical Engineering
Virginia Polytechnic Institute

Data dealing with effect of temperature on viscosities of acrylic monomers³ can be correlated by means of the equation

$$\log \eta = a + \frac{b}{t+210}$$

where —

 η = viscosity

t = temperature

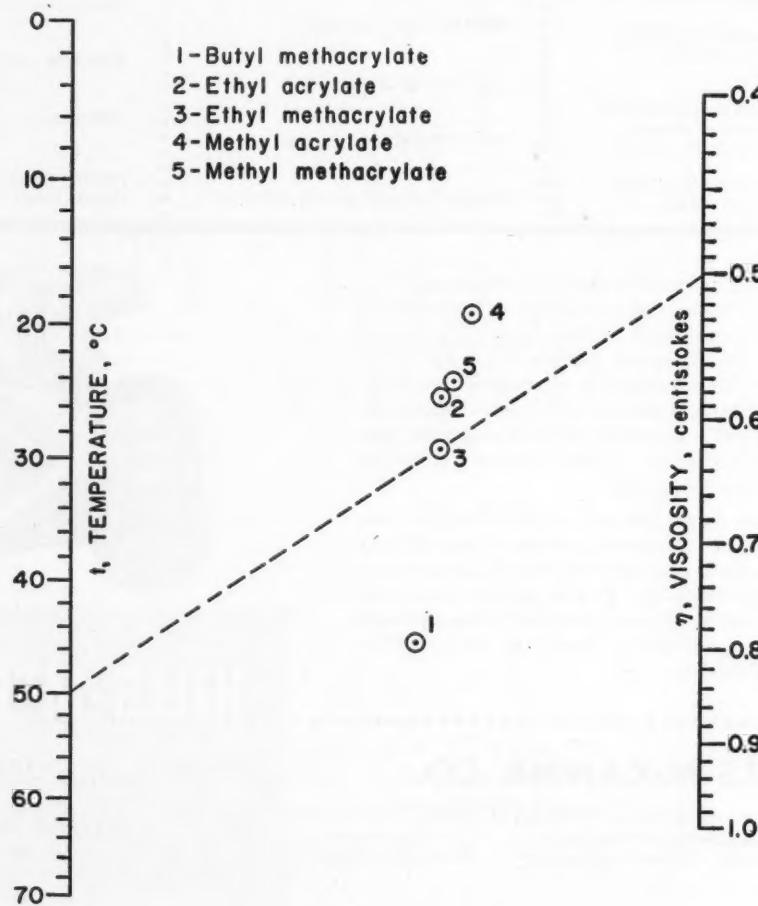
a & b depend on the monomer

This nomograph, constructed by application of pre-

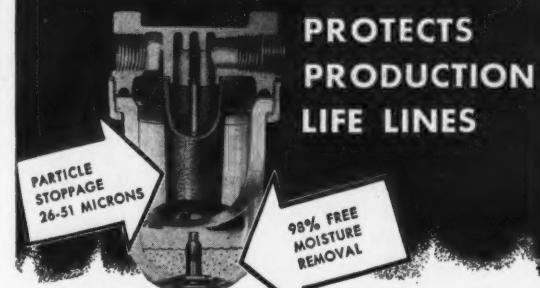
viously described methods^{1,2}, affords convenient solution of the equation. Dashed index line shows that viscosity of ethyl methacrylate is approximately 0.50 centistoke at 50°C.

LITERATURE CITED

- (1) DAVIS, D. S., "Empirical Equations and Nomography," Chap IX, McGraw-Hill Book Co., New York (1943)
- (2) DAVIS, D. S., "Nomography and Empirical Equations," Reinhold Publishing Corp., New York (1955)
- (3) RIDDELL, E. H., "Monomeric Acrylic Esters," p. 13, Reinhold Publishing Corp., New York (1954)



Arrow AIR LINE FILTER



**Arrow Autopneumatic Controls
Prevent Work Stoppage — Save Repairs**



- IMPROVE MACHINE AND TOOL EFFICIENCY
- LOWER MAINTENANCE AND REPAIR COSTS
- LESS AIR POWER WASTE—HIGHER OUTPUT

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You get every ounce of performance out of your air-powered equipment, cylinders, valves, impact wrenches, tools, etc. with the ARROW AUTOPNEUMATIC CONTROL ASSEMBLY. The compressed air is properly cleaned. The Regulator Valve controls pressure without waste of air and the ARROW Lubricator supplies the correct amount of fine oil mist in the air stream to properly lubricate appliances or tools in operation. The Automatic Trap discharges accumulated sludge to give perfectly conditioned and controlled compressed air for uninterrupted production schedules.

Tool down-time, operator lost time, parts replacements and expensive repairs are practically eliminated.

All the Facts Are Yours for the Asking

Let ARROW field consultants point the way to better production economy at no cost to you. ARROW will be happy to send you their engineering catalog and make recommendations. Your inquiries invited.



When inquiring check CP 3935 opposite last page

Piston packing manual

Operating diagrams and typical installations of piston packing for air cylinders, hydraulic cylinders, and reciprocating pumps are covered in 16-page, two-color bulletin. Textures and types of packing available for specified pressure, temperature, and corrosive conditions are listed. Proper packing compositions for specifically listed fluids, including various gases, acids, and alkalis are included.

Bul 5503 is issued by Darling Valve & Manufacturing Company, Dept. CP, Walnut & Marshall St., Williamsport, Pa. When inquiring specify CP 3936 on form opposite last page.

Gives blower's engineering details, technical specifications

Engineering details and technical specifications for blower, designed to handle air or other gases under pressure or vacuum, are given in four-page, two-color folder. Cross sectional view shows principal component parts. A digest of applications and performance characteristics curves are included.

Bul B-154 is available from Read Standard Corp., Dept. CP, 370 Lexington Ave., New York 17, N.Y. Specify CP 3937 on form opposite last page.

Covers case history on epoxy coating

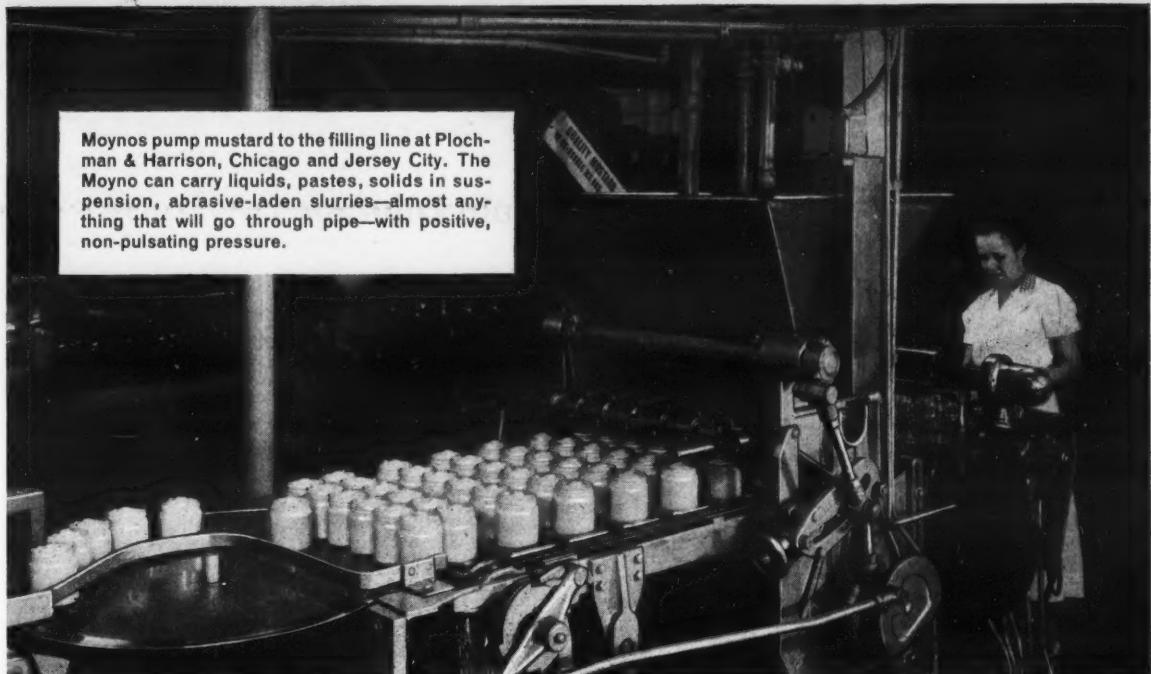
Four-page bulletin tells how epoxy coatings have withstood hydrochloric acid, caustic soda, heat, humidity, and frequent scrubings for two years at a Newark antibiotic plant. A number of photographs of the coatings in service after two years exposure are shown. Fourth page of bulletin describes ten coatings available from manufacturer.

Bulletin covering case history is issued by David E. Long Corp., Dept. CP, 220 East 42nd St., New York 17, N.Y. Specify CP 3938.

Describes chemical motors that resist corrosion

Line of chemical motors designed for maximum resistance to corrosion are described in four-page bulletin. Among features that help to eliminate corrosion are stainless steel shell over housing, removable bearing caps, and non-corrosive ventilating fan.

Bul 1050 is issued by The Louis Allis Co., Dept. CP, Milwaukee 7, Wis. Specify CP 3939.



Moynos pump mustard to the filling line at Plochman & Harrison, Chicago and Jersey City. The Moyno can carry liquids, pastes, solids in suspension, abrasive-laden slurries—almost anything that will go through pipe—with positive, non-pulsating pressure.

Mustard Mill Changes to MOYNO® Pumps to Get Positive Displacement, Longer Pump Life

Features of the MOYNO that may solve YOUR pumping problem

Gentle: no churning; won't break up semi-solids . . . won't aerate liquids. May be used for metering.



Reversible: pumps with equal efficiency in either direction.

Trouble Free:

self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain.

Positive Displacement:

Moynos are available to pull up to a 29" vacuum while discharging under pressure. Big Moynos deliver up to 500 g.p.m. Pressures to 600 p.s.i. plus are available.

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO

• BRANTFORD, ONTARIO



Fractional and Integral HP Motors



Household Fans



Hoists and Cranes

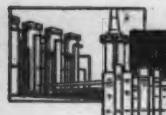


Large and Small Moyno Pumps



Propellair Industrial Ventilating Equipment

When inquiring check CP 3940 opposite last page



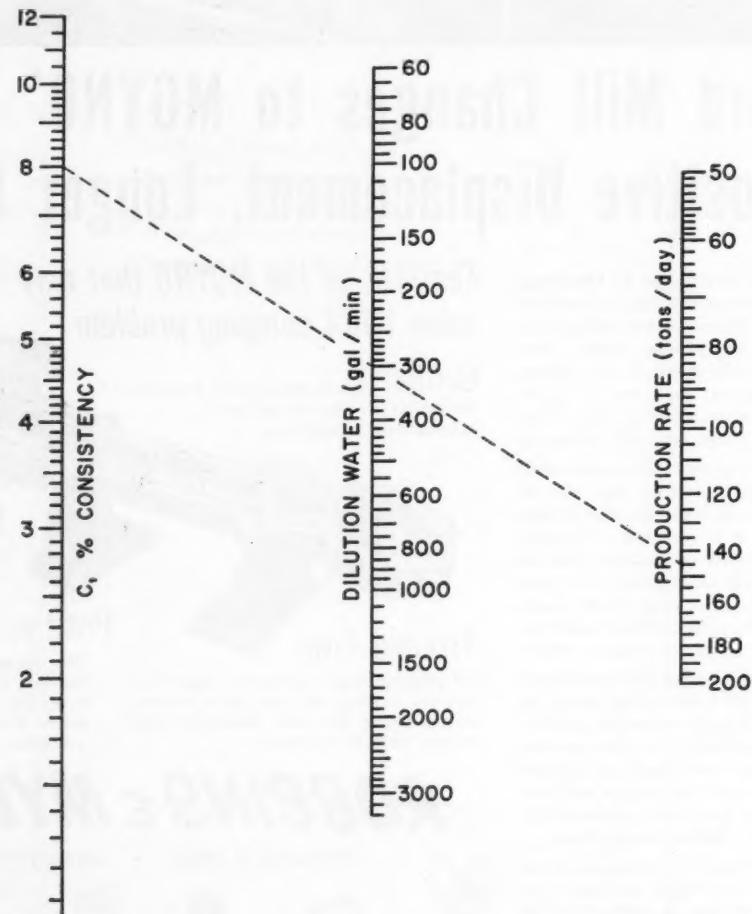
Estimating Pulp Dilution

by CLAUDE McQUILLEN, Jr.
H & W Division of Scott Paper

Edited by D. S. DAVIS
Professor of Chemical Engineering
Virginia Polytechnic Institute

This nomograph is designed to relate dilution water rate, and consistency and production rate of bleached paper pulp. It is based on the equation

$$G = 0.167 \frac{T}{C}$$



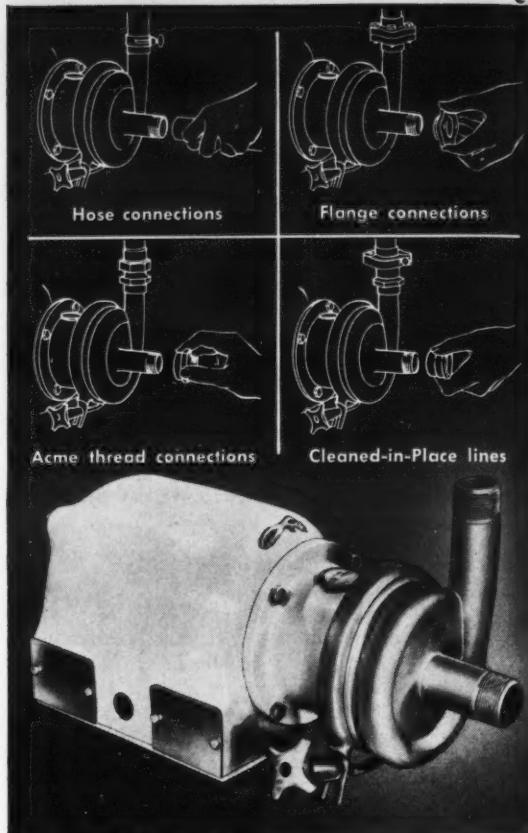
where —

G = dilution water rate	gpm
T = production rate for pulp	tons/day
C = consistency of pulp	%

Typical Example

At what rate should dilution water be added to 8% pulp to achieve a production rate of 145 tons per day of pulp? Align 145 tons per day with 8% consistency and read water rate as 300 gpm.

CUT HERE AND FILE



Standard with I.P.S. connections

New CHERRY-BURRELL Vapor Blast Finish 316 Stainless Steel Pumps

As shown above, you can connect new Cherry-Burrell foamless "Flexflo" Centrifugals in any of 5 different ways. In addition, you position adjustable outlet to fit any pipeline setup.

Should you want to clean or inspect any of the corrosion-resistant Type 316 fortified stainless steel contact surfaces, you disassemble pump in 30 seconds—reassemble in 60—all without tools.

Other Flexflo Features

Low Operating Costs: Body design assures full flow discharge with low friction loss, reduced power.

Positive Sealing with less pressure, less wear.

Capacity Range: From 2000 lb./hr. to 100,000 lb./hr. and heads up to 120 ft.; 1/4 to 10 h.p. motors.

Ask your Cherry-Burrell Representative for further Flexflo details. Or write for literature.



427 W. Randolph Street, Chicago 6, Ill.
Dairy • Food • Farm • Beverage • Brewing • Chemical-Equipment and Supplies
SALES AND SERVICE IN 58 CITIES—U.S. AND CANADA



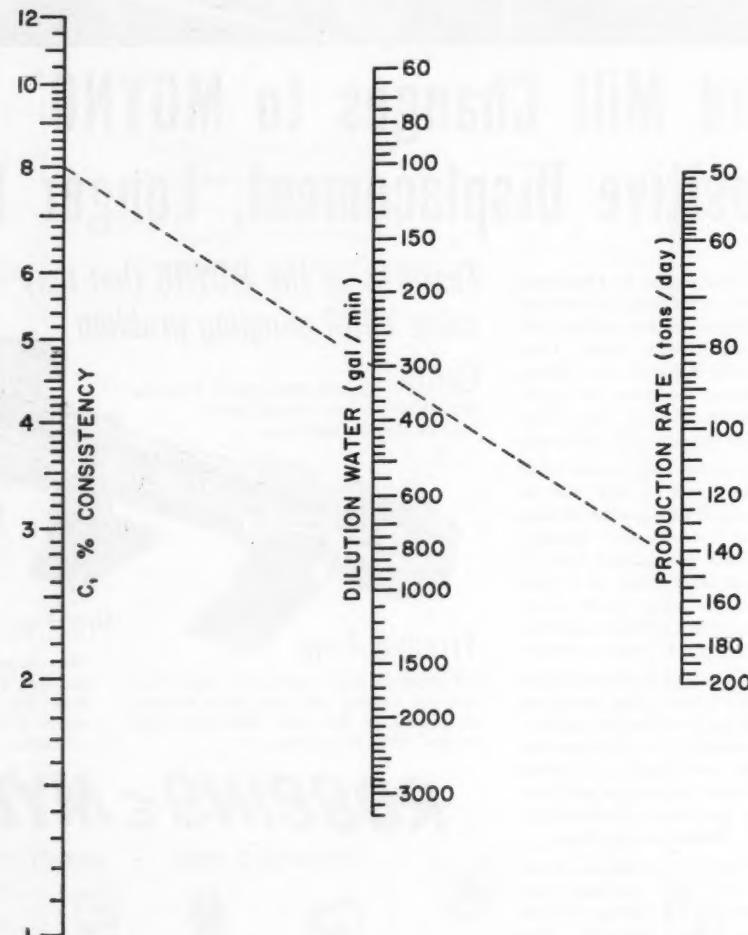
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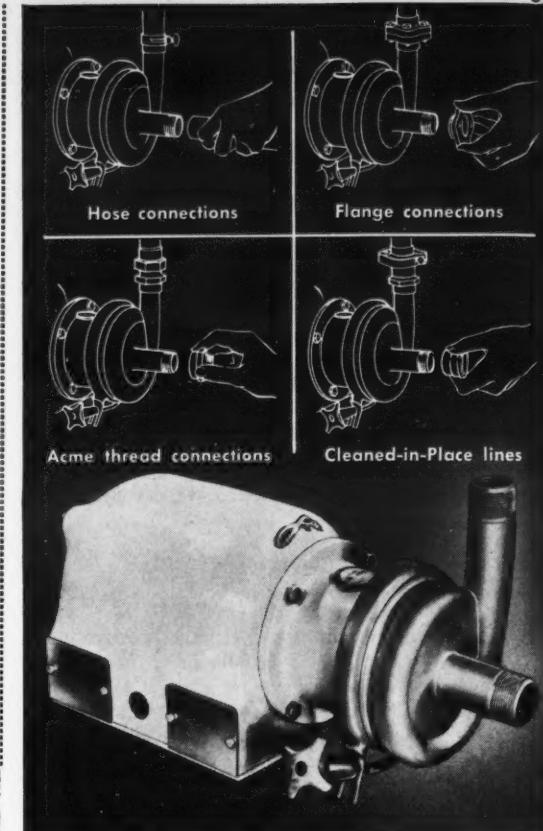


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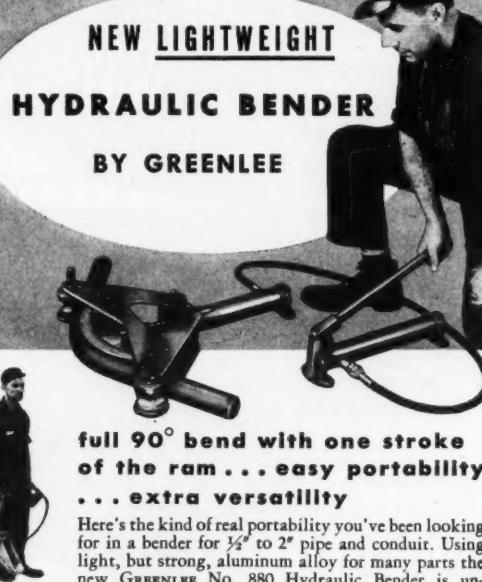
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Air Conditioning	Machine Design	Electricity, AC
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GREENLEE TOOL CO., 2382 HERBERT AVE., ROCKFORD, ILL.
When inquiring check CP 3943 opposite last page

FEBRUARY, 1956

NEW LITERATURE

Revised bulletin details swivel joints for piping

Specification, dimension, and application data on swivel joints used for piping connections to moving or movable parts are given in 12-page, two-color bulletin. Comprehensive treatment uses photos, line drawings and cutaway views to depict construction and application features.

Catalog 265-B is available from Dept. J-13, Barco Manufacturing Co., Dept. CP, 501 Hough Street, Barrington, Illinois. When inquiring specify CP 3944 on form opposite last page.

Specifications on line of control valves

Four-page booklet covers manufacturer's line of diaphragm control valves. Data include actuator and body specifications, flow characteristics, and complete dimensions for double-seated, single-seated, and 3-way valves comprising the line.

Spec Sheet 429 is issued by Industrial Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne & Windrim Aves., Philadelphia 44, Pa. When inquiring specify CP 3945 on form which is located opposite last page.

Pictures rheometers in two colors

Two-color bulletin of eight pages describes manufacturer's line of rheometers, gelometers, auxiliary equipment for making dispersions, polymers, and lubricants. Auxiliary equipment described includes a paint mill for formulation and development of small laboratory samples.

Bul 330 is issued by Burrell Corporation, Dept. CP, 2223 Fifth Ave., Pittsburgh 19, Pa. When inquiring specify CP 3946 on form which is located opposite last page.



Electronic Longhand speeds operations, reduces errors, and cuts communications cost way down. You write in longhand on the transceiver. Instantly your message is reproduced in the receiver on plain paper or Instan-Form*—within the building or many miles away. Your TelAutograph Tele-Scriver System can be one-way, two-way or multiple intercommunication—especially designed for you. It can be leased or purchased. Either way, it saves \$1,000's annually in production control, material and quality control, sales orders, accounting, central files, etc. Send coupon for full details, mailed to you.

MASTERSTROKE IN COST-CUTTING

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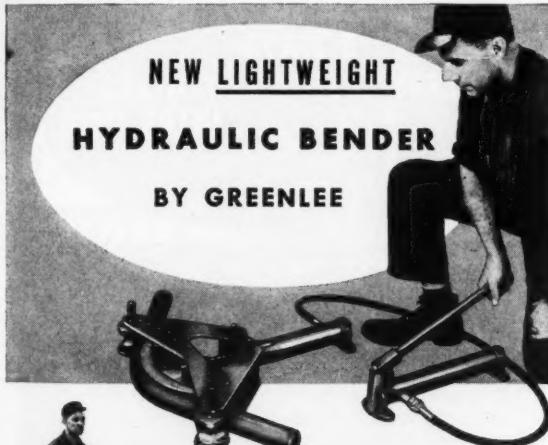
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Architecture	Physics	Physical & Thermodynamic Data
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Building Construction	Mechanics of Materials	Electricity, DC
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When inquiring check CP 3942 opposite last page



full 90° bend with one stroke of the ram... easy portability... extra versatility

Here's the kind of real portability you've been looking for in a bender for $\frac{1}{2}$ " to 2" pipe and conduit. Using light, but strong, aluminum alloy for many parts the new GREENLEE No. 880 Hydraulic Bender is usually *lightweight*, yet extra rugged, fast, *powerful*! One man can easily carry and operate it to quickly make *uniform* bends. Complete 90° bends can be made with one ram stroke! Separate two-speed hydraulic hand pump and ram simplify handling and setup. Easily operated by hand or can be used with a power pump. Attachments also available for bending thin-wall conduit, tubing, bus-bars. Get complete details, write for Bulletin E-217.

GREENLEE TOOL CO., 2382 HERBERT AVE., ROCKFORD, ILL.
When inquiring check CP 3943 opposite last page

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Bul 330 is issued by Burrell Corporation, Dept. CP, 2223 Fifth Ave., Pittsburgh 19, Pa. When inquiring specify CP 3946 on form which is located opposite last page.

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Electronic Longhand speeds operations, reduces errors, and cuts communications cost way down. You write in longhand on the transceiver. Instantly your message is reproduced in the receiver on plain paper or Instan-Form—within the building or many miles away. Your TelAutograph Tele-scriber System can be one-way, two-way or multiple intercommunication—especially designed for you. It can be leased or purchased. Either way, it saves \$1,000's annually in production control, material and quality control, sales orders, accounting, central files, etc. Send coupon for full details, mailed to you.

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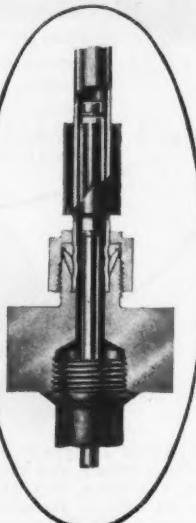
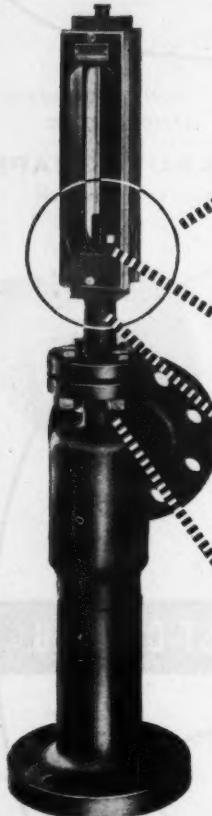
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BROOKS LEADERSHIP achieved by design

This AR-MET ROTAMETER...



POSITIVE INDICATION

A magnetic follower that never loses bond . . . offers minimized friction, minimized hysteresis.

ALL METAL CONSTRUCTION

Eliminates packing and packing problems. Holds on even the most difficult services without a chance of leakage.

THRU-BOLTED DESIGN

Easy to assemble and disassemble. No frozen stud bolts . . . no drilling and tapping.

TAKES PRACTICALLY ALL FLUIDS OFF THE "HARD TO HANDLE" LIST

If you're working with highly penetrable fluids . . . high temperatures, high pressures . . . Brooks Ar-Met Rotameters are made to order for you.

The Brooks Ar-Met Rotameter with Mag/Na/Vue indicating extension is shown . . . however, Ar-Met meters are also available with six other alarm and transmission extensions, both electrical and pneumatic. Write for Bulletin 103.

Ar-Met and Mag/Na/Vue are trade-names.

a complete line...

BROOKS 
ROTAMETERS ...for every service

BROOKS ROTAMETER COMPANY
103 EIGHTH STREET • LANSDALE, PA.

When inquiring check CP 3948 opposite last page

NEW LITERATURE

Safety engineering for home study

Industrial safety engineering has been added to curriculum of home study subjects. Course is specifically designed to help industrial supervisors in charge of safety, industrial engineers desiring safety training, safety representatives of labor departments.

Course is described as consisting of 41 lessons requiring an average study time of 650 hours. Subjects included are mathematics, machine sketching, blueprint reading, industrial psychology, handling of materials, plant and production equipment layout, and safety principles and practices.

Literature on "Industrial Safety Engineering" is issued by International Correspondence Schools, Dept. CP, Wyoming & Ash St., Scranton 9, Pa. Specify CP 3949 opposite last page.

Oils, aromatics, specialties

Wholesale price list gives essential oils, citrus concentrates, floral absolutes and concentrates, aromatic chemicals, fixatives, colors, and other chemical specialties in manufacturer's line.

"October 1955 Price List" is issued by Fritzsche Brothers, Inc., Dept. CP, 76 Ninth Ave., New York 11, N.Y. Specify CP 3950 opposite last page.

Data on glass fiber plastic pipe

Chemical resistance, electrical properties, and physical properties of glass fiber plastic pipe are given in eight-page folder. Installations are also listed.

Bul on glass fiber plastic pipe is issued by Reflin Co., Dept. CP, 5730 Kearny Villa Rd., San Diego 11, Calif. Specify CP 3951 opposite last page.

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When inquiring check CP 3952 opposite last page

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When inquiring check CP 3953 opposite last page

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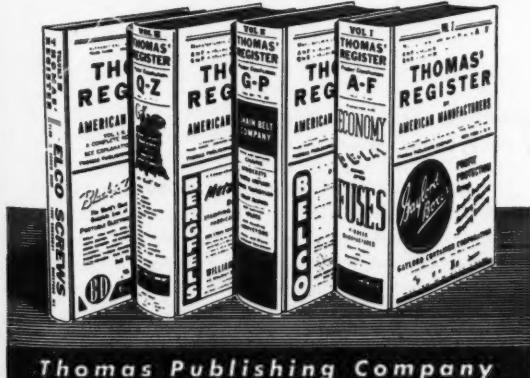
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When inquiring check CP 3955 opposite last page

FEBRUARY, 1956

NEW LITERATURE

Tells about magnesia

All the various grades, grinds, purities of magnesia that are made by General Magnesite & Magnesia Company of Norristown, Pa. are described in eight-page data bulletin. Uses, typical analyses, physical characteristics, packaging, freight classification, descriptions, and quantities for each of the nine types are given.

"Chemical Magnesias and Magnesite" is available from the distributor, Harwick Standard Chemical Co., Dept. CP, 60 S. Seiberling St., Akron 5, Ohio. When inquiring check CP 3956 on form opposite last page.

Shows elapsed time in tight spots

Miniature elapsed time indicator is illustrated and described in single page engineering bulletin. Bulletin points out that total panel space of meter is 1-3/4" square. Time in hours or minutes is shown on clock-like dial. Features and specifications are outlined in bulletin.

Engineering Bulletin 5 is issued by Haydon Mfg. Co., Inc., Dept. CP, Torrington, Conn. When inquiring specify CP 3957 opposite last page.

Pick correct sling at a glance

Wall chart is designed for display in industrial plants. It lists diameters and lifting capacities of wire rope slings, shows correct support for various loads. Chart measures 17 x 21 inches and is printed in three colors.

Wall Chart is issued by American Chain & Cable Co., Inc., Dept. CP, 929 Connecticut Ave., Bridgeport 2, Conn. When inquiring specify CP 3958 on form which is located opposite last page.

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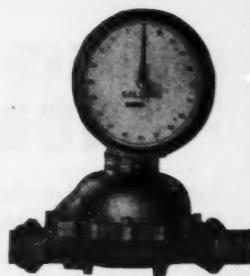
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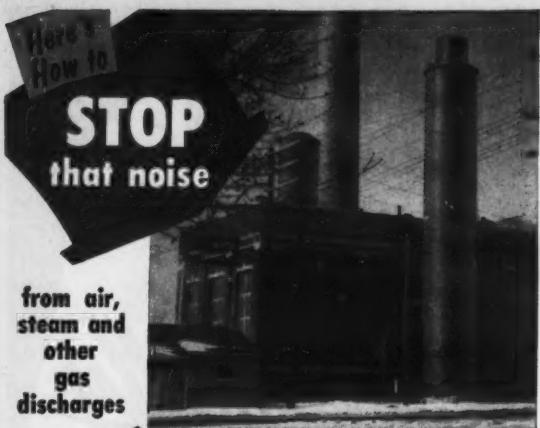


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When inquiring check CP 3959 opposite last page



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— are engineered to effectively correct your specific noise or pulsation problem.

They are available in many different basic types for arresting intake and exhaust noises, some of which may integrally incorporate such additional features as air cleaning—or heat recovery—or spark arresting—or surge control—or water separating.

Others, which are primarily designed to stop line surges set up by compressors, pumps, blowers, etc., will effect noteworthy savings in piping, repairs and maintenance, and permit accurate flow readings.

There is no obligation for recommendations.
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BURGESS-MANNING COMPANY

Sound Control 721 East Park Avenue, Libertyville, Illinois
Dallas, Texas

When inquiring check CP 3960 opposite last page

new literature

(Continued from preceding page)

Location factors that influence future of US petrochemical industry

The factors that will affect the future geographic distribution of the US petrochemical industry that is based on methane, ethylene, and acetylene are examined in a 45-page study by Walter Isard and Eugene W. Schooler of MIT. In addition, there are 60 pages of appendices covering input requirements, economies of plant scales, and transport cost differentials.

Study PB-111640 may be obtained by remitting \$3.00 direct to Office of Technical Services, US Dept. of Commerce, Washington 25, D.C.

"How to" properly cleanse biological glassware

Describing how to effectively cleanse biological glassware by hand and machine washing, 12-page booklet includes typical washing flowsheet. Suggested operations can be adapted to particular conditions. Booklet also describes four products of manufacturer to be used in suggested wash cycles, either hand or machine.

"Professional Cleansing of Biological Glassware" is issued by Finger Lakes Chemical Co., Inc., Dept. CP, Etna, N.Y. When inquiring specify CP 3961 on form opposite last page.

Literature cites advantages of vertical dryers

Vertical transfer-type dryers, capable of handling wide range of materials are reviewed in six-page folder. Literature cites applications, advantages, and operating characteristics. Drawings and photographs are included.

Bul 3506 is issued by Wyssmont Company, Inc., Dept. CP, 42-05 27th Street, Long Island City 1, New York. When inquiring specify CP 3962 on form opposite last page.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

Technical catalog describes flotation units

Flotation units are described in detail in illustrated 20-page technical catalog. Over 35 photographs are included, showing design, construction, and features of the equipment. Schematic flow diagram illustrates unit's operation.

Cat "The Gibbs Flotation Unit" is issued by F. S. Gibbs, Inc., Dept. CP, 2300 Washington St., Newton Lower Falls 62, Mass. When inquiring specify CP 3963 on form opposite last page.

Cathodic protection systems for corrosion control

Principles used to control corrosion by means of cathodic protection systems are described in detail in 12-page illustrated brochure. Case histories presented show the actual savings that have been made by the use of such systems. Another section of publication shows how cost reductions can be made by using pipe with minimum wall thickness and then applying cathodic protection.

Bul 4078-HC is issued by Harco Corp., Dept. CP, P.O. Box 7025, Cleveland 28, Ohio. When inquiring specify CP 3964 on form opposite last page.

Bulletin on remote metering of flow, level, pressure

Two-color bulletin of eight pages describes remote metering of flow, level, pressure, temperature, gate position. Control of pumps, chemical feeders, valves, and levels are also covered. Bulletin contains product photos and installation drawings in addition to descriptions of system's operation.

Bul 230-H4A is issued by Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, R. I. When inquiring specify CP 3965 on form opposite last page.

MANAGEMENT DEVELOPMENT

(Continued from page 7)

The series of conferences always started at the top of the organization with the manager as the leader. His group was comprised of those who normally report directly to him, unless an insufficient number made it necessary to include another echelon. At the conclusion of the manager's series, each member led a series with those individuals who reported directly to him. This procedure continued until it covered the entire supervisory organization.

Each meeting lasted one and one-half hours and was held once a week, with the membership always remaining the same. A member of the training section participated in each meeting as an observer and to insure uniformity of procedure. Another of his duties was to measure results. Complete records were kept of the actions of each group. Each leader was furnished with a week-to-week outline to guide him in conducting the conference series. The length of the series varied from thirteen to twenty weeks.

Here are some of the results which we observed of the group meetings. It must be emphasized that these are observations and not validated evidence. However, there have been many experiments conducted by qualified individuals where the findings either duplicate or closely parallel our own experiences.

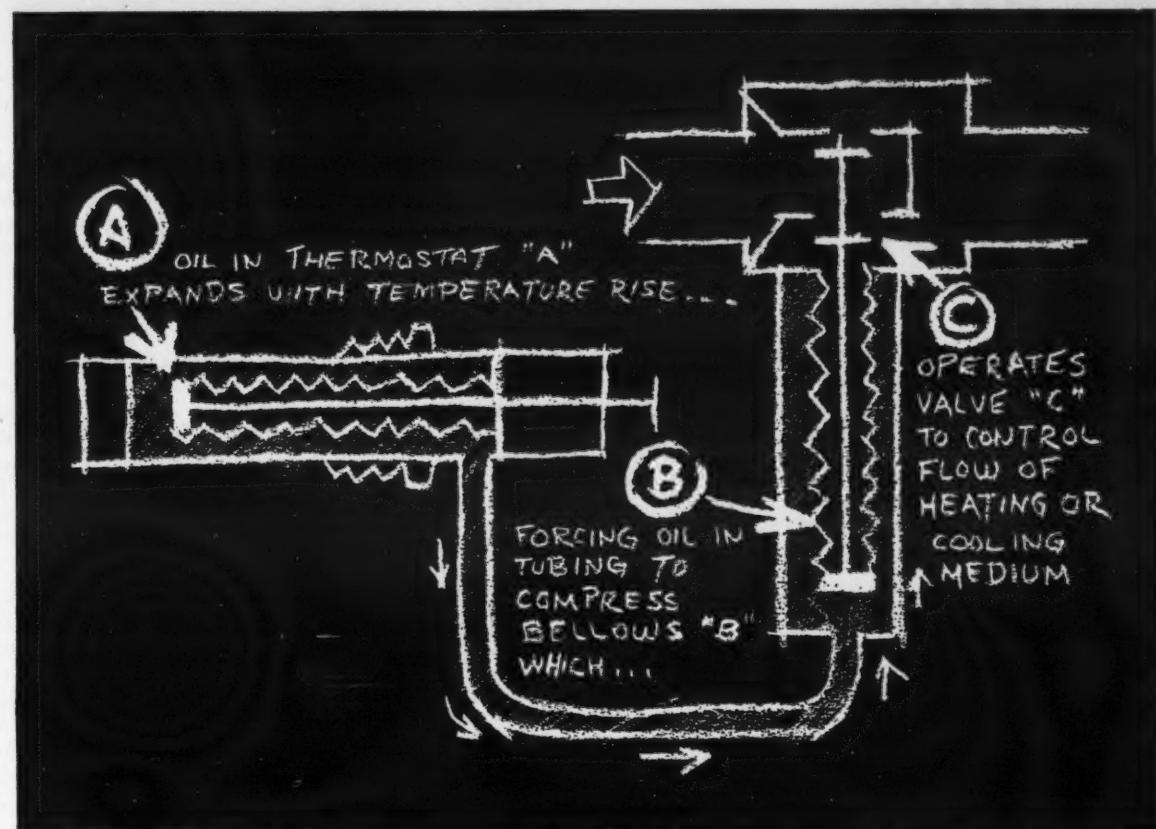
Change in perception — Of the many changes which may occur in the individual as a result of his conference experiences, this is the most important. The phenomenon provides a basis for the development of other very important results. In day-to-day intercourse with other individuals, the press of daily activity necessitates that things get done in a hurry. The average manager accomplishes his ends through the actions of other people. This is impossible unless the manager is aware of their needs, desires, and attitudes. Their attitudes, needs, and desires are based on their perceptions of things around them. They react as they themselves see the situations and not necessarily as their supervisor sees them. Effort is required to make each aware of the degree of perception of the other.

The conferences were mentioned as being of one and one-half hours duration over a period of thirteen to twenty weeks. This allows from twenty to thirty hours of close contact between the supervisor, who is the leader, and his subordinates. As a result, each person has ample opportunity to observe the results of the perceptions of his superior as well as his associates. We have come to accept that such a degree of contact does not take place unless through a definite procedure such as the group conferences.

The strengthening of perception in the individual leads to several areas of improvement in his day-to-day relations with his associates.

One improvement is in each participant's awareness

(Please turn to next page)



Automatic Temperature Control

AS SIMPLE AS A-B-C!

And what could be simpler!

A Just take another look at that rough sketch. That's all there is to it. A simple thermostat — a length of tubing — a valve. That's all!

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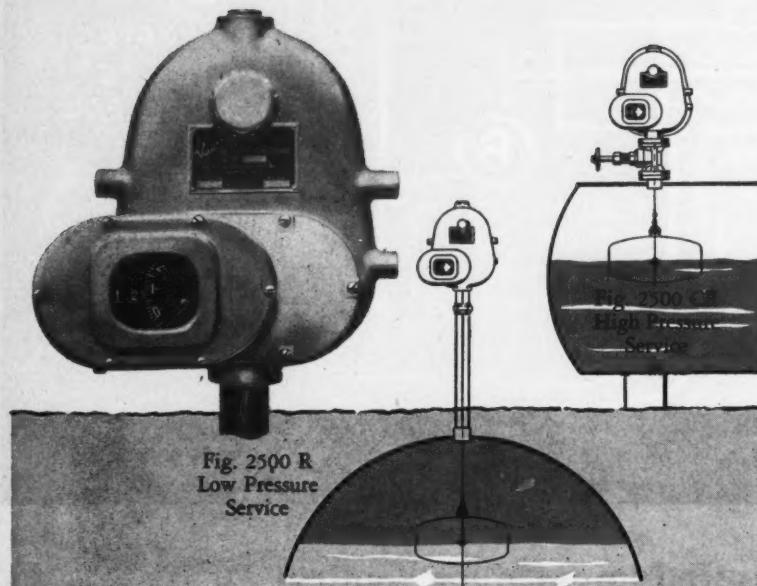
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21368

When inquiring check CP 3966 opposite last page

NEW! TOP READING AUTOMATIC TANK GAUGE

"Varec" **2500 R** SERIES



Introducing a special adaption of the Figure No. 2500 series, designed for use on all tanks, below or above ground, where top readings are required.

Elbow sheaves and brackets are eliminated on this model. The stainless steel tape is connected from the gauge head to float in a straight line. Elimination of extra parts reduces friction; therefore, greater accuracy can be expected.

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For higher working pressures to 300 p.s.i.g., the Figure No. 2500 CR is recommended. Its counter mechanism is magnetic driven, no packing glands or mechanical seals required on the rotating shaft. Convenient provision is made for mounting remote gauger transmitters, and high or low level limit switches for sounding alarms, lighting lights, starting and stopping pumps, etc.

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961-12

When inquiring check CP 3967 opposite last page

MANAGEMENT DEVELOPMENT

(Continued from preceding page)

and receptiveness to the ideas of others. Each member of the group conference has an opportunity to relate his opinions and views on some of his past experiences. In an industrial culture these experiences are, of necessity, similar to those of his associates.

The evaluation of these experiences, however, varies to a considerable degree. The discussion of each one provides the participants with an opportunity to re-evaluate his own, depending upon the similarity of events. Different interpretations cannot but broaden the sensitiveness to new ideas and imaginative sympathy of each individual. Actual insights into problems are greatly increased. As the group continues to function as a unit of the organization — outside the conference — a stronger over-all relationship exists.

A second improvement is in each individual's skill in interpersonal relationships. Every conference group eventually encounters difficulty in getting agreement at some stage of the series. This happens several times and almost always it can be traced to the bias or prejudice of some of the members. Overcoming this difficulty requires patience and understanding of the other members. Properly conducted, the conference series does not allow an individual to be beaten down by a majority action. One or two individuals assume the leadership of segments of the group in this situation. These are the individuals who serve as arbitrators between the disputants. Since their leadership is assumed and their role conciliatory, their example can be of great value to other members who observe them in action. This, of all things, must be learned by observation of others.

After each conference series the members were asked what impressed them most. A majority felt that the manner in which some individuals handled their relationships in the group was of greatest value.

The third improvement is in developing a pattern of "organizational" behavior. Since each leader of a group is also the supervisor of the members, the situation can be dangerous if not properly integrated. The role of the conference leader is sometimes in conflict with the role of supervisor. A good conference leader must subordinate some of the requisites of the supervisor.

If properly done, this exchange of roles serves only to increase the respect of the members for the supervisor, their conference leader.

The most important result of this method is the "carry-over" from the conference to the actual work situation. In only very isolated cases have the relationships established in the group sessions failed to endure in actual work areas. The experiences which have been discussed in conference serve as a reference point in settling differences

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When inquiring check CP 3968
opposite last page

CHEMICAL PROCESSING

MANAGEMENT DEVELOPMENT

which arise later. The mutual understanding of human relationships constitutes the foundation of a common language by which communications are made easier.

Many people have inquired why some groups require twenty sessions to complete the series while others require only thirteen. The answer is that some groups are initially better integrated than others.

The amount of time required to produce a smooth working conference group is often a measure of the effectiveness of the segment of the organization from which the members come. The difficulties arise from any one or all of several sources. Two of the most important obstacles are differences in status in the organization and failure of the individual to identify himself with the working group which eventually comprises the conference membership. Again it has been noted that groups composed almost wholly of specialists take longer to integrate as a general rule.

+

+

+

Are you wondering why many editorial articles give . . .

Manufacturer's Name and Address . . . ?

You doubtless have noted names and addresses of manufacturers at the end of editorial articles in **CHEMICAL PROCESSING**. Have you wondered, "Is this some sort of advertising?"

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THE EDITORS

Waste eliminated in cellulose production with SPARKLER

engineered water filtration system



Pure white cellulose is produced with Sparkler filtered water.

One of the South's largest producers of cellulose, the Southern Chemical Cotton Co., Chattanooga, Tenn., obtains its water from the City of Chattanooga. This is river water coagulated with alum and passed through gravity sand filters. The chemical and physical properties of this water vary over a wide range due to great fluctuations of demand and change in river conditions. At times conditions are very detrimental to Southern Chemical's cellulose production.

During the conversion of raw cotton linters into chemical cotton, a large amount of water is used. The fine cotton fibres filter out and retain any trace particles contained in the water. Thus, objectionable minerals would discolor and contaminate the material. This resulted in the production of off color cellulose, above specifications of certain elements.

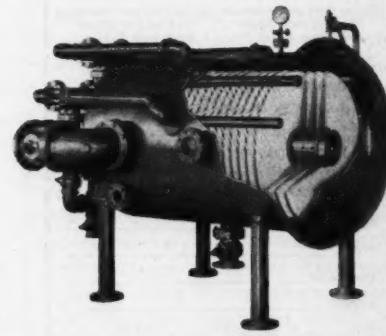
Three Model SCJ-40-25 Sparkler Water Filters, having a total filtering area of 1,200 square feet, were installed to alleviate this condition. These filters handle more than 5,000,000 gallons of water per day and efficiently remove the particles which formerly caused Southern Chemical's production difficulties. Plant officials credit their Sparkler water filter installation with eliminating a troublesome production problem and helping consistently to produce a product of satisfactory quality.

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Sparkler International Ltd. with plants in Canada, Holland, Italy and Australia • Service representatives in principal cities throughout the world.

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The Three Model SCJ Sparkler Water Filters that purify city water to alleviate waste condition.



Sparkler SCJ Self-Cleaning Water Filter — A diatomite, surface type filter available in capacities from 900 to 120,000 gallons per hour.

When inquiring check CP 3969 opposite last page

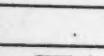
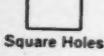
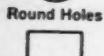
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Are the openings of uniform size, shape and spacing?	<input type="checkbox"/>	<input type="checkbox"/>
Is the temper of the metal proper for your requirements?	<input type="checkbox"/>	<input type="checkbox"/>
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Are they easy to keep clean?	<input type="checkbox"/>	<input type="checkbox"/>

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Discussed in this issue—

PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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BRIDGEPORT BRASS COMPANY
CONDENSER AND HEAT EXCHANGER TUBE EDITION

COPPER ALLOY BULLETIN

BRIDGEPORT
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MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



New Electronic Spectrograph
Maintains High Tube Quality

One of the important aspects of the manufacture of heat exchanger tubes is the maintenance of uniformly high metallurgical standards.

Metallurgical quality control has been of prime importance to Bridgeport Brass for many years, since it is essential to top product performance as well as customer satisfaction.

Whenever possible, Bridgeport has utilized the latest advances in product quality control, developed new techniques for analysis, and adopted new instruments to aid metallurgists in maintaining uniform quality. A typical example of this is the use of a newly developed electronic spectrograph to analyze the composition of alloys from which Bridgeport makes heat exchanger and condenser tubes.

In operating this spectrograph, a small cast sample of the alloys is positioned in the instrument. By means of an electric arc the sample is instantaneously heated to a vapor state. This vaporized portion emits a brilliant light which, by means of a grating, is broken up into the component wave lengths of the various elements present in the speci-

men in much the same way daylight is divided into a multihued spectrum by a prism. These wave lengths are directed on a battery of sensitive photoelectric cells, and the voltage developed by the cells as a result of the light striking them is measured and used as the controlling medium. A ratio of the intensities of the wave lengths is automatically recorded on a chart and calibrated to permit a direct reading of the percentage of each element in the sample.

With Bridgeport's Spectrometer it is possible to make a complete analysis of a sample containing as many as 14 elements in less than five minutes. Formerly, an analysis could take as long as 16 hours to complete.

Bridgeport was one of the first companies to use this instrument for copper-base alloy analysis. Both company metallurgists and production experts derive important benefits from electronic analysis as compared with the standard spectrographic and chemical methods.

At Bridgeport's plants, billet samples taken from casting furnaces are sent

via pneumatic tubes to the electronic spectrograph. Because an analysis is completed in a matter of minutes, changes in the mixture in many instances can be made before the next sample is taken.

Bridgeport's condenser tube customers are benefiting directly by this improved spectrograph service. The electronic spectrograph has helped to combat corrosion by accurately determining the exact alloy composition for any given tube service in addition to lowering production costs, reducing waste, and stepping up movement of metal from furnaces to rolling mills. By reducing the load on photographic-type spectrographs for analysis, production of top-quality metal is accelerated, permitting improvement of Bridgeport's policy of giving immediate consideration to customer's specifications and analysis requests.



Drum comparator (above, left) quickly indicates compositions determined by spectrophotograph.

In addition to achieving more control by use of the spectrophotograph, the mechanics of alloy analysis have been greatly speeded. As a result, Bridgeport metallurgists are able to devote more time to research and experiments with new alloys for heat exchanger and condenser tubes.

Use of the electronic spectrometer marks a tremendous advance in product testing and control. Addition of this instrument to its facilities is just one of the many forward-looking steps constantly being made by Bridgeport Brass to bring better condenser and heat exchanger tubes and service to its customers.

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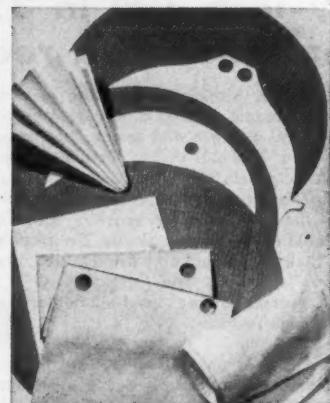
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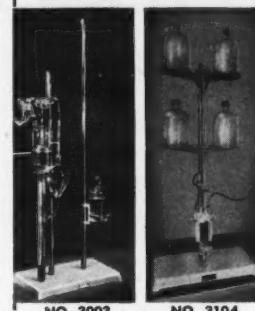


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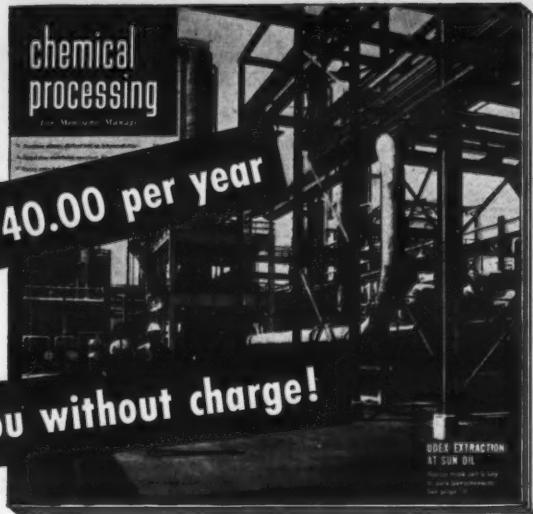
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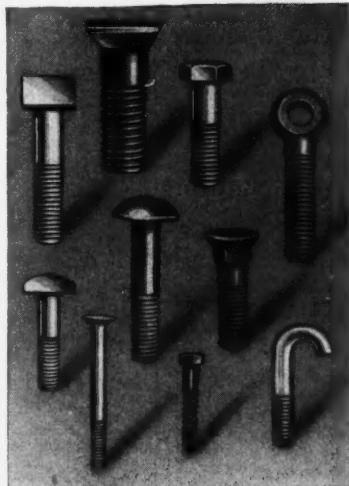
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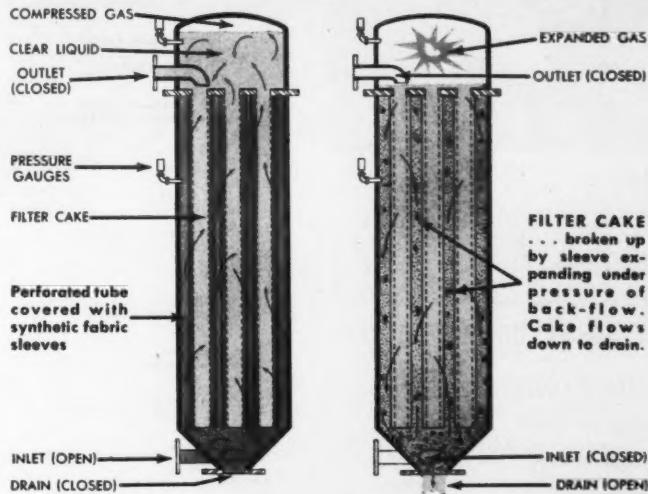
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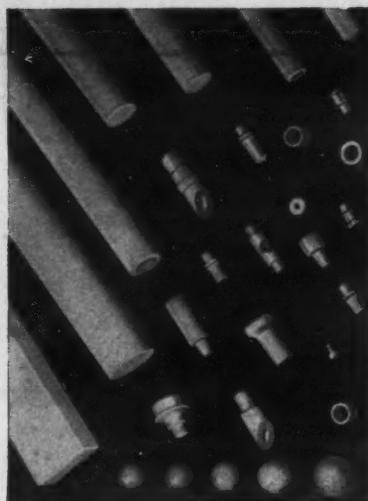


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FEBRUARY 1956

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3396	Electric Fork Trucks	3442f	Tetrachloro Phthalic Anhydride	3492b	Antifoam AF Emulsion	3543	Conductivity Cell	3596	Stainless Fittings	3612	Stainless Tubing and Pipe
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3722h	Willsey Concentration Table	3778	Material						
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3722j	Standard Dryer		Eye-wash Fountain						
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THAT'S
INTERESTING

(Continued from page 2)



"And now he insists on reporting them, too!"

Not fit for human ears

Roar of jet exhaust can now be turned on or off at will. Exhaust gases are forced through many small openings which raises pitch of sound beyond range of human hearing. Low roar becomes a high-pitched hiss. (Armour Research Foundation Industrial Research Newsletter)

Art world invaded
by plastics

Vinyl-base pigments, similar in appearance to oils, are taking their place as a new medium for the artist and illustrator. Made from a special vinyl, the pigments can be fused by applying heat with a lamp for two to five minutes . . . and the paintings done in this material, called Vasco, are waterproof. (GoodChemCo News, B. F. Goodrich Chemical Co.)

Hobnails don't harm
urethane paints

Floors in the near future will be getting coats of paint that are even resistant to traffic of hobnail boots or golf shoes. Responsible for the gloss-like finish are urethane coatings, made from isocyanate and polyester chemicals. The coatings, produced as a two-component system by Mobay Chemical Co. of St. Louis, are also highly resistant to grease, oils, acids and alkalis.

For more information on product at right, specify CP 3983
see information request blank opposite last page.



average
extraction time
cut 33 1/3%

Once more the ANY-SPEED Oilgear Drive bettered machine performance "painless"

Many times in our experience the performance of an already highly efficient machine has been bettered without redesign, solely by changing the drive. One case out of many varied cases, is the Tolhurst Centrifugal pictured above, located in a great pharmaceutical house. This centrifugal was originally equipped with a two-speed electric motor drive. However the chemicals it is called upon to handle have widely varying crystal packing characteristics. Some of these crystals packed so densely at the speed available, extraction was inhibited, extraction time far out of balance and crystal removal difficult.

A change was made to an "ANY-SPEED" Oilgear Fluid Power Drive. Now the operator is able to shade the speed of the centrifuge experimentally—and easily discover the best speed for each batch of crystals.

As a result, extracting that used to take from 6 to 9 hours was cut to 4 to 6 hours. The extremely slow speed also available made unloading a great deal easier. This user now has several other Oilgear drives including one on a laboratory centrifuge.

There is very often a direct efficiency coefficient between machine operating speed and the type of work being handled. And we can cite many widely varying instances where equally dramatic and profitable gains resulted at once from a simple change to "ANY-SPEED" Oilgear Fluid Power Drives. If you want some interesting factual data on Oilgear's steplessly variable speed drives, their outstanding responsiveness to control impulses, their smooth acceleration and deceleration, talk to an Oilgear Engineering Representative. His mature and sound engineering recommendations may profit you greatly. THE OILGEAR COMPANY, 1583 W. Pierce St., Milwaukee 4, Wisconsin.



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